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RESOURCE INVENTORY

CYPRESS HILLS PROVINCIAL PARK · ALBERTA

VOLUME 1

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RESOURCE INVENTORY

CYPRESS HILLS PROVINCIAL PARK · ALBERTA

PROLOGUE

The objectives of this "Resource Inventory, Analysis, and Conceptual Planning Study" of Alberta's Cypress Hills Provincial Park were twofold: (1) to document the diverse resources, land-uses, and facilities of the Park, and (2) to make recommendations for (a) upgrading the Park, emphasizing a nature-oriented and interpretive focus, in line with current Provincial Parks policy, and (b) reconciling current multiple land-use conflicts.

In effecting these objectives large amounts of data were generated and are presented in three separate volumes: Resource Inventory, Analysis, and Conceptual Planning.

Resource Inventory

This volume provides inventories and descriptions of the various physical, biological, and cultural resources of Cypress Hills Provincial Park. Other major topics considered in Volume 1 include facilities, user demand, land ownership and parks policy.

The Resource Inventory document represents the refined data bank used in the analysis and conceptual planning phases of this project. It will serve, in future, as a standard reference on the resources of the Park.

Analysis

The analysis document, Volume 2, represents the conversion of hand mapped inventory data into computer format maps. The digitized data were then used to derive the ecological zones map. The entire park area was analyzed according to suitability for and potential impact of future facilities such as roads, trails, campgrounds and picnic sites. Finally, existing facilities were evaluated according to the two categories of suitability and impact.

Conceptual Planning

Results of the conceptual planning phase of this study are presented in Volume 3. The principal findings of the inventory and analysis phases are summarized and their implications in conceptual planning are evaluated. The most significant "activity zones" of the Park are identified and analyzed in greater depth than in the other volumes. Volume 3 also includes recommendations pertaining to the development of appropriate activities, facilities, and circulation within the context of park policy, and a rational phasing schedule.

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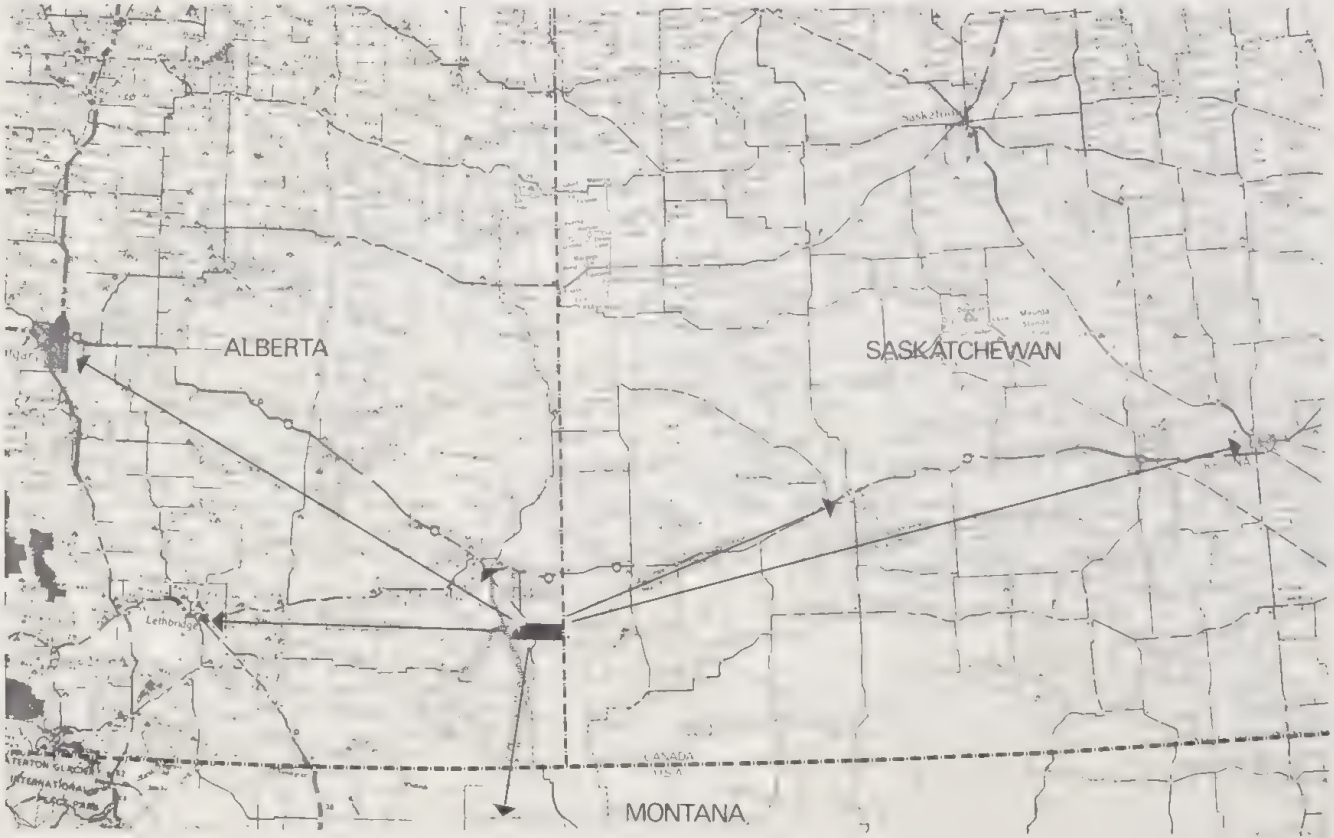
PHYSICAL RESOURCES

The Cypress Hills is a flat-topped plateau covering about 1,000 square miles, one-third of which lies in Alberta. Trending in an east-west direction, it is about 85 miles long and 25 miles wide. The eastern end of the plateau rises from the prairies near Eastend, Saskatchewan from an elevation of about 3,500 feet above sea level and continues sloping upward to the west reaching a height of 4,810 feet at its north-western extremity where it then terminates abruptly forming a steep escarpment dropping to the plains 1,000 feet below. The location of the Cypress Hills Park is shown in Map 1; various topographic and slope characteristics of the Alberta portion of the Hills are illustrated on Maps 2 to 4.



LEGEND

PARK LOCATION

1

CYPRESS HILLS PROVINCIAL PARK

Alberta

RESOURCE INVENTORY, ANALYSIS AND CONCEPT (2) PLANNING

Lombard North Group

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LEGEND

- greater than 4700
- 4500 - 4700
- 4300 - 4500
- 4100 - 4300
- 3900 - 4100
- less than 3900

TOPOGRAPHY

2

CYPRESS HILLS PROVINCIAL PARK

Alberta

RESOURCE INVENTORY, ANALYSIS AND CONCEPT PLANNING

Lombard North Group

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LEGEND

- 0 - 2%
- 2 - 5%
- 5 - 10%
- > 10%

SLOPES

3

CYPRESS HILLS PROVINCIAL PARK
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RESOURCE INVENTORY ANALYSIS AND CONCEPTUAL PLANNING

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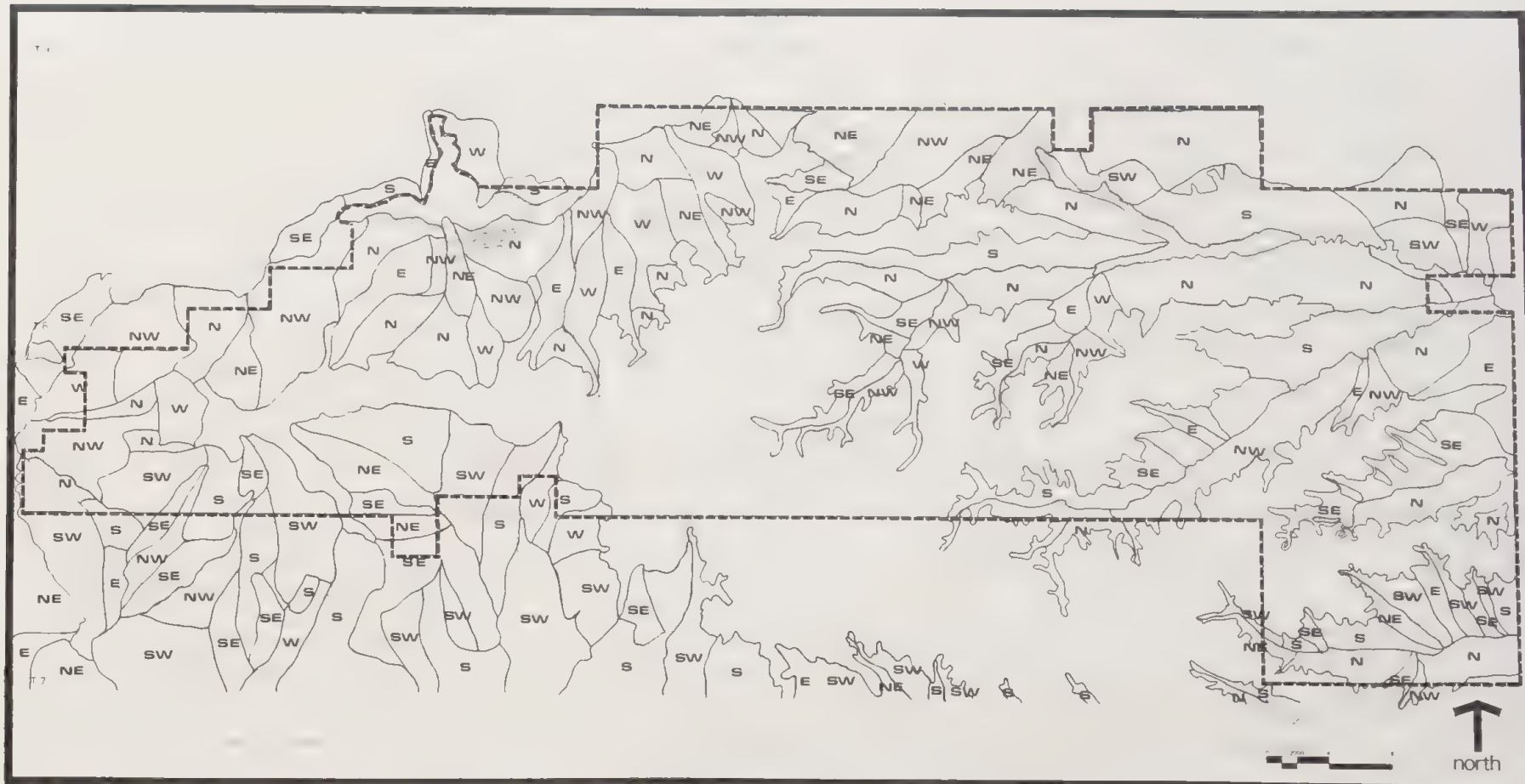

LEGEND

N	NORTH	**NW**	NORTHWEST
S	SOUTH	**SW**	SOUTHWEST
W	WEST	**SE**	SOUTHEAST
E	EAST	**NE**	NORTHEAST

SLOPE ORIENTATION

4

CYPRESS HILLS PROVINCIAL PARK

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GEOLOGIC HISTORY

BEDROCK GEOLOGY

SURFICIAL DEPOSITS

LANDFORMS

ECONOMIC GEOLOGY

● GEOLOGY

Cypress Hills Provincial Park covers the northern half of the Cypress Hills plateau in Alberta. Rising over 1,000 feet above the level of the surrounding plains, the plateau is comprised of rocks of Oligocene, Paleocene, and Cretaceous ages. Mantling the periphery of the plateau are a variety of unconsolidated deposits of Pleistocene and Recent ages. These relationships are illustrated in Table 1. This distinctive geologic condition is the basis for the physical distinction between the Cypress Hills and the surrounding plains. This, in turn, has directly influenced topography, climate, hydrology, and vegetation.

GEOLOGIC HISTORY

The Cypress Hills plateau owes its existence to two major factors: (1) the presence of the porous, resistant Cypress Hills Formation capping the plateau, and (2) the location of the plateau along a drainage divide. These two factors have created an upland area which is especially resistant to normal erosion. The porous sand and gravel beds capping the plateau cause almost all the rainwater to percolate into the ground to become ground water, thus impeding stream erosion. Its location on the boundary between drainage basins, where the streams are small and are diverted away from the divide, ensures that the ridge will be the last feature of the landscape to be eroded. (The Cypress Hills plateau is part of the divide separating streams flowing to Hudson's Bay via the South Saskatchewan River system from streams flowing to the Gulf of Mexico via the Missouri River system.)

The origins of these two unique factors traces back millions of years to the beginning of the Cenozoic Era. For the vast bulk of geologic time, encompassing both the Mesozoic and Paleozoic Eras, the Cypress Hills area was much like any other area situated along the great inland seaway of North America. During the Eocene Epoch, however, major mountain building (orogenic) activity brought about

Table 1

Geologic Time Chart

ERA	PERIOD	EPOCH	FORMATION
Cenozoic (Age of Mammals)	Quaternary	Recent	Surficial Deposits
		Pleistocene	Surficial Deposits
	Tertiary	Pliocene	
		Miocene	
		Oligocene	Cypress Hills Fm.
		Eocene	
		Palaoecene	Ravenscrag Fm.
Mesozoic (Age of Reptiles)	Cretaceous		Frenchman Fm.
	Jurassic		Battle Fm.
	Triassic		Whitemud Fm.
			Eastend Fm.
			Bearpaw Fm.
Palaeoezoic (Age of Invertebrates)	Permian		
	Carboniferous		
	Devonian		
	Silurian		
	Ordovician		
	Cambrian		
Precambrian			

Photo 1. Outcrop of Frenchman Formation along Ferguson Road overlooking Elkwater Lake.

Photo 2. Outcrop of Cypress Hills Formation near upper Graburn Creek.

Photo 3. Police Point landslide. Note hummocky wooded slopes which characterize the north face of the plateau.

Photo 4. Small delta in Battle Creek formed by sediments washed down from Police Point landslide.

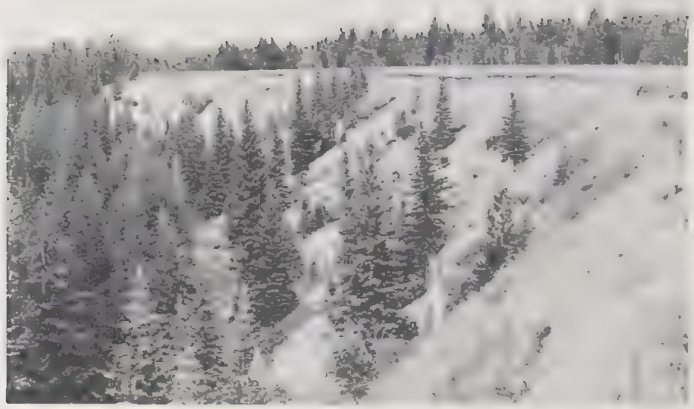


Photo 5. Plateau escarpment at Horseshoe Canyon viewpoint.

Photo 6. Reesor Lake meltwater channel with plateau to right and outlier to left.

the formation of the Rocky Mountains. As a result, enormous amounts of debris were eroded from the mountains and transported across a low, sloping bedrock surface (pediment) and deposited far out onto the plains region. By Oligocene time these gravels and boulders, which were to become the Cypress Hill Formation, had spread as far as the Cypress Hills area.

Subsequent uplift of the Cypress Hills region, related in part to the geologic activity which also formed the Sweet Grass Hills, elevated the area thereby establishing it as a drainage divide. After it was uplifted the large streams flowing from the mountains eroded the surrounding land isolating the Cypress Hills as a low plateau. Its unique resistant features, however, ensured that the Cypress Hills plateau would persist as an upland area.

Thus prior to the encroachment of continental (Laurentide) glaciation during the Pleistocene Epoch the Cypress Hills plateau had already developed basically its present form. The landscape surrounding the plateau, however, has been significantly modified by glaciation. The ice sheet which crept across the region from the north flowed around the plateau engulfing all but the top 300 feet which stood as an island (nunatak) above the Wisconsin-age ice sheet. Eventually as the glacier melted, strong winds transporting silt and sand blanketed the unglaciated portion of the plateau with thick deposits (loess); material transported by the glacier (till) was dumped on the underlying bedrock; and meltwater flowing from the melting glacier coursed between the plateau and the glacier to carve out valleys, such as Medicine Lodge Coulee.

More recent events such as slumping, landslides, and stream erosion have added the final detail in the creation of the Cypress Hills landscape.

BEDROCK GEOLOGY (Map 5)

The flat lying strata forming the Cypress Hills plateau is comprisec of rocks of Upper Cretaceous, Paleocene, and Oligocene Ages.

Upper Cretaceous

Bearpaw Formation

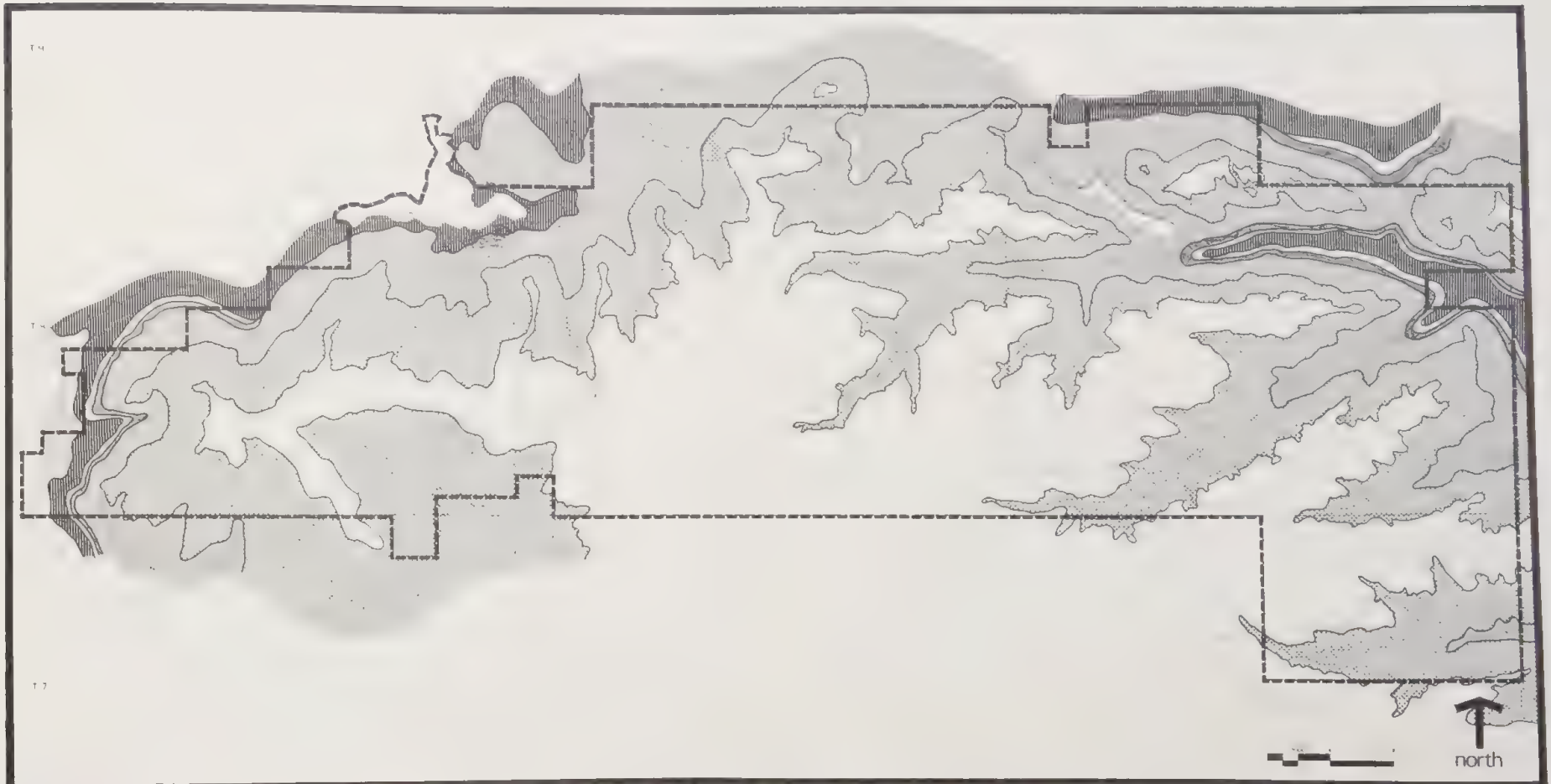
The Bearpaw Formation borders the Cypress Hills plateau on all sides and can be considered the base level formation upon which the younger rocks comprising the plateau rest. It consists of dark grey, flaky shale with occasional sandstone beds; spheroidal ironstone concretions and bentonite beds are common; locally it is fossiliferous containing ammonites. The best exposures in the immediate area are present northwest of the Hills along Gros Ventre Creek. The local thickness of the Bearpaw strata is about 830 feet

Eastend Formation

The Eastend Formation accurs only in the Cypress Hills area where it appears at the foot of the main escarpment. It consists of light grey and brown, medium-grained, massive sandstones and dark grey shales. The best local exposures are near the west end of the Hills on Willow Creek. Near Elkwater Lake a mineable coal seam occurs about 70 feet below the top of the formation. The local thickness of the Eastend strata is about 400 feet. It constitutes an important groundwater aquifer for the Park.

Whitemud Formation

The Whitemud Formation appears on both the north and south slopes of the Cypress Hills but, because of its softness, good outcrops



LEGEND

TERTIARY

OLIGOCENE

Cypress Hills Fm

PALEOCENE

Ravenscrag Fm

CRETACEOUS

UPPER CRETACEOUS

Bearpaw Fm

BEDROCK GEOLOGY

5

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are rare. It consists of grey sandstone and white, kaolinitic clay with inter-bedded carbonaceous shale. These clays are especially valuable as ceramic clay. Excellent exposures occur near the west end of the Hills at Quarry No. 34, located in Section 20, T 8, R3W4, where the clay is mined to supply some of the clay for the ceramic plants at Medicine Hat; it is also exposed along Battle Creek near the east end of the Park. The local thickness of the Whitemud strata is about 25 feet.

Battle Formation

The Battle Formation also appears on both the north and south slopes of the Cypress Hills but, again, good outcrops are rare; its distribution corresponds closely with the Whitemud Formation. It consists of dark purplish grey, bentonitic shale; in the upper part the Kneehills tuff, a siliceous tuff (volcanic) bed about eight inches thick, occurs. The best local exposures are at Quarry No. 34; there the Battle strata is about 30 feet thick.

Frenchman Formation (Photo 1)

The Frenchman Formation occurs only in the Cypress Hills area. It consists of light grey and brown, medium-grained, crossbedded sandstone with interbedded shale. Excellent exposures occur on the north slope of the Hills along Highway 48, Ferguson Road, and Mitchell Ridge Road. The Frenchman Formation is locally fossiliferous and preserves Tricerotops fauna - the latest known fauna to include dinosaurs before they became extinct at the close of the Mesozoic Era. The local thickness of the Frenchman strata is about 250 feet. Locally it constitutes a potential groundwater aquifer.

Paleocene Age

Ravenscrag Formation

The Ravenscrag Formation appears along the upper slopes of the Cypress Hills plateau. It consists of soft, light grey and brown, fine-grained sandstone and siltstone with numerous interbedded coal streaks and bentonite layers; locally it is fossiliferous containing leaves and mollusks. The thickness of the Ravenscrag strata is about 225 feet.

Oligocene Age

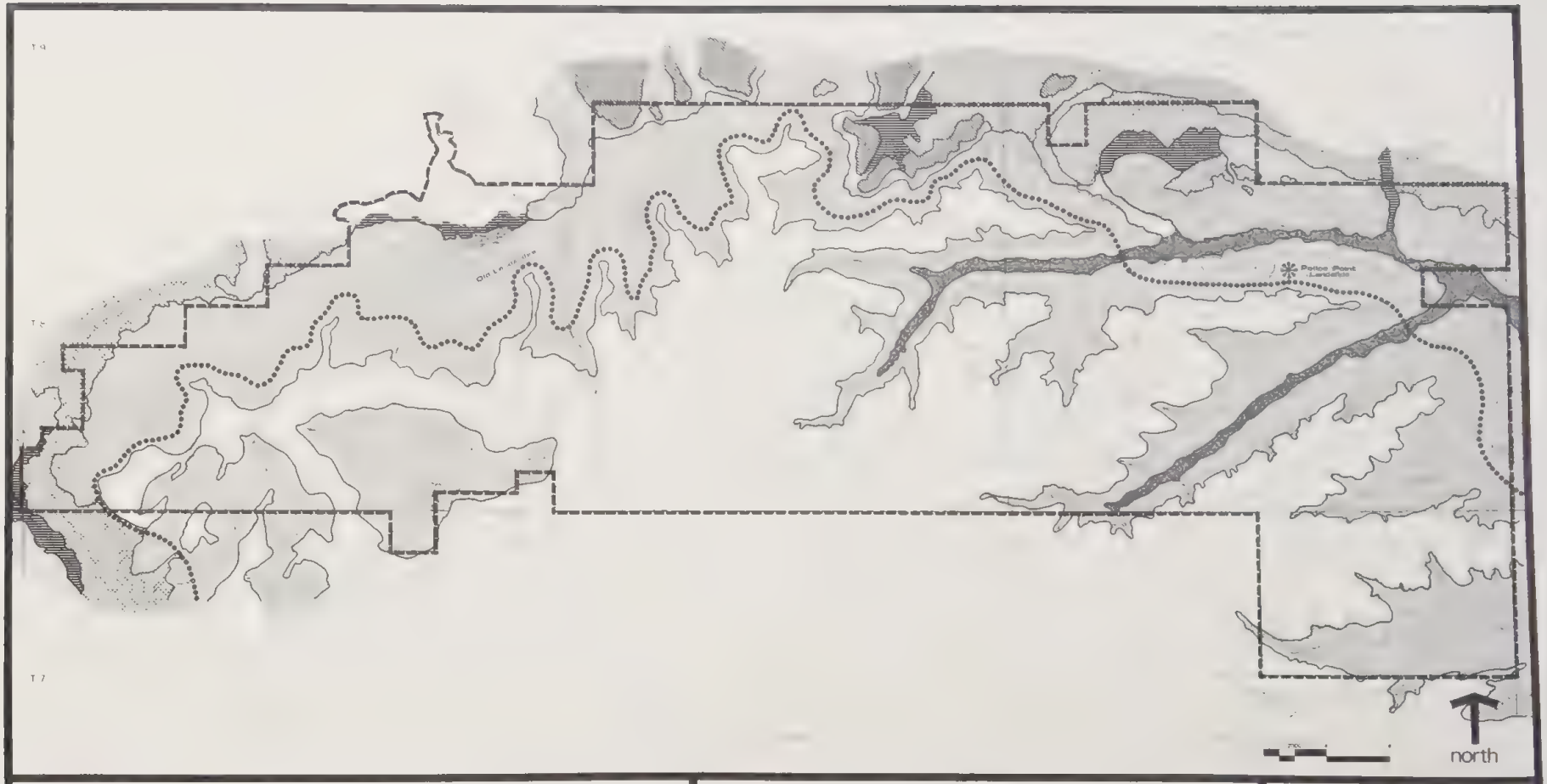
Cypress Hills Formation (Photo 2)

The Cypress Hills Formation, which caps the Cypress Hills plateau, constitutes the youngest formation within the study area. It consists of hard, well-cemented conglomerate with minor lenses of sandstone; the conglomerate consists mainly of quartzite and chert cobbles. Excellent exposures occur on the north slope of the Hills along Highway 48, Ferguson Road, and Mitchell Ridge Road. The Cypress Hills Formation further east is locally fossiliferous and preserves a varied vertebrate fauna, such as sabre-toothed tigers. The local thickness of they Cypress Hills strata is about 35 feet. General characteristics of the bedrock formations are described in Table 2.

SURFICIAL DEPOSITS (Map 6)

Pleistocene Deposits

Mantling the bedrock around the periphery of the plateau are a variety of unconsolidated Pleistocene age deposits; they are com-



LEGEND

RECENT
- alluvium

RECENT & PLEISTOCENE
- eroded slope (wooded)
- colluvium & alluvial fan

PLEISTOCENE

GLACIO FLUVIAL
- meltwater channel deposits
- outwash

GLACIAL
- hummocky morraine

AEOLIAN
- loess

DRIFT
- thin undifferentiated pleistocene deposits

limit of glaciation

SURFICIAL DEPOSITS

6

CYPRESS HILLS PROVINCIAL PARK

Alberta

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prised of four major types: glaciofluvial, glacial, aeolian, and drift.

Glaciofluvial Deposits

These deposits consist of material transported, sorted, and deposited beyond the limits of the glacier by streams derived from the melting glacier. Two types of glacialfluvial deposits are present in the area: meltwater channel deposits and outwash. The meltwater sediments occur in meltwater channels which are relict glacial river valleys carved by meltwater flowing from the glacier; these deposits are comprised of sand, silt, and clay up to 100 feet thick. These channel deposits constitute potential ground water aquifers. The outwash consists of small, sand and gravel outwash deposits present in front of the end moraines north of the Cypress Hills plateau.

Glacial Deposits (till)

Till is nonsorted, nonstratified material deposited directly by the glacier without transport by wind or water. It is subdivided on the basis of topography into ground moraine, hummocky moraine, and end moraine. Ground moraine has local relief of less than 10 feet; hummocky moraine has local relief of more than 10 feet; end moraine resembles ground and hummocky moraine except that it occurs as aligned ridges which parallel former positions of the ice front rather than in irregular masses.

Much of the landscape surrounding the Cypress Hills plateau is covered by level to hummocky to ridged glacial deposits comprised of poorly-sorted gravel, sand, silt, and clay up to 100 feet thick. Till may also contain very large, ice-transported boulders (erratics); a number of these are present immediately northwest of Reesor Lake.

Table 2

Engineering Characteristics - Bedrock Formations

FORMATION	DESCRIPTION	GENERAL ENGINEERING CHARACTERISTICS
Cypress Hills	conglomerate & sandstone	potentially unstable along rim; source of granular material
Ravenscrag	sandstone siltstone, lignite, bentonite	unstable; susceptible to mass movement
Frenchman	sandstone	stable; potential ground water aquifer
Battle	shale, bentonite, tuff	unstable; low shearing strenght; susceptible to mass movement
Whitemud	sandstone, clay, shale	stable; source of ceramic clay
Eastend	sandstone, shale, lignite	unstable; susceptible to mass movement; potential groundwater aquifer, potential coal source
Bearpaw	shale, sandstone, bentonite	unstable, low shearing strength; susceptible to mass movement

Aeolian Deposits (loess)

Loess deposits result from the transporting action of the wind. The unglaciated portion of the Cypress Hill plateau and the adjacent slope to the south is covered by loess comprised of sand, silt, and clay generally less than five feet thick. It is slightly deformed by frost action which has elevated pebbles from the underlying Cypress Hills Formation.

Drift

Drift refers to thin, undifferentiated Pleistocene deposits mantling bedrock. Flanking the plateau are areas of thin glaciofluvial, glacial, and aeolian deposits - less than 50 feet thick - where the surface expression of the deposit is controlled by the underlying bedrock surface.

Recent Deposits

The final details of the landscape have been added by deposits of Recent age; some of the processes involved are still active. These deposits are classified into three major types: alluvium, eroded slope, and colluvium and alluvial fan.

Alluvium

Alluvium consits of sediments laid down in river beds, flood plains, and lakes. The alluvial deposits within the Hills are associated primarily with the two major streams, Battle and Graburn Creek, and the shoreline of Elkwater Lake; minor deposits occur, of course, along the stream courses throughout the area. These deposits range from gravel and sand to silt and clay. The two major stream flood plain deposits constitute prospective ground water aquifers.

Eroded Slopes

These deposits relate to the heavily wooded slopes prominent on the north face of the plateau and are composed of slump material and colluvium. The slump material (also termed landslide) is soil and bedrock debris which has moved down slope en masse, that is, as a unit under the influence of gravity. Colluvium refers to the loose and incoherent soil and rock debris moved down slope by gravity. These deposits are comprised of sand, silt, and clay.

Landslides are common along the valley slopes throughout the Park giving the hillsides their characteristic hummocky appearance. The Police Point landslide is the most recent and dramatic example of this type of activity (Photos 3 and 4). Locally, such as along the escarpment near Nine Mile Creek, linear tension cracks occur which are indicative of future landslides. The Elkwater townsite is built upon an old landslide deposit which covers an extensive area at the foot of the Hills. Although presently stabilized, the presence of ground water seepages in this area raises the concern that this area may become unstable. In utilizing the Park's slope areas, that is, its over-steepened areas, it is important not to disturb the natural equilibrium as this could result in geologic instability.

Colluvium and Alluvial Fan Deposits

The colluvium described here relates to the loose debris moved down slope by gravity in the non-wooded areas. Alluvial fan deposits are laid down where a swift moving stream or channelized flow moves onto a level plain or meets a slower stream. These deposits range from sand to silt to clay.

General engineering characteristics of the surficial deposits are described in Table 3.

Table 3

Engineering Characteristics - Surficial Deposits

Alluvium	gravel, sand, silt (sorted)	subject to periodic flooding; source of granular material; potential ground water aquifer.
Eroded Slope	sand, silt, clay	unstable; soil creep processes active.
Colluvium & Alluvial Fan	sand, silt, clay	unstable; soil creep processes active.
Meltwater Channel	sand & silt (sorted)	stable; source of granular material; potential ground water aquifer.
Outwash	gravel & sand (sorted)	stable; source of fill material
Till	gravel, sand, silt, clay	stable; source of fill material
Loess	sand, silt, clay	unstable; susceptible to wind and water erosion and frost action.
Thin Drift	gravel, sand, silt, clay	stability dependent upon underlying bedrock formation.

LANDFORMS (Map 7)

Many of the geologic processes and deposits within the Hills manifest themselves as distinctive landforms. There are seven major landform types integral to the Hills: plateau, slope/scarp, outlier, meltwater channel, flood plain, outwash apron, and knob and kettle topography.

Plateau (Photo 5)

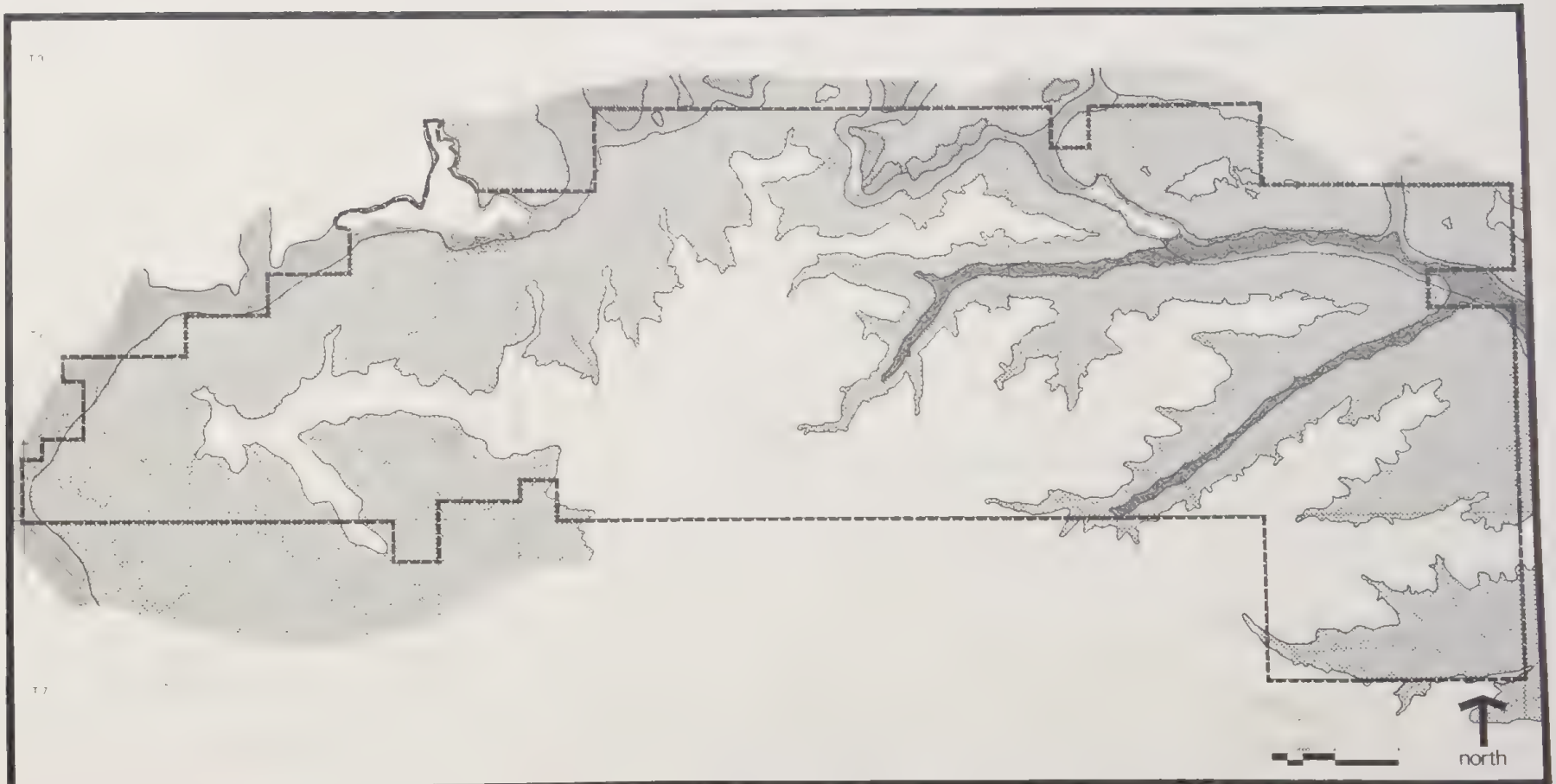
The dominating and essential landform of the Cypress Hills is, of course, the plateau or "bench". This flat, elevated plain is bounded on the north and west by an abrupt descent to the adjacent plains; to the south and east (in Saskatchewan) the slope is gradual, finally merging with the surrounding plains. The plateau surface itself dips to the northeast at about 15 feet per mile. The views from the north and west escarpment provide dramatic, panoramic vistas of the peripheral, glacially sculptured landscape.

Slope/Scarp

The steep, north and west faces of the plateau are characterized by slopes typically greater than 10 per cent, and sometimes nearly vertical; they are thickly wooded with stands of spruce, pine, and aspen providing a hilly, multi-coloured backdrop to the lower recreation areas. Occasionally dramatic geologic activity such as the Police Point Landslide illustrate vividly the mechanism by which the plateau was created and at the same time is being eroded away.

Outlier

Occasionally portions of a plateau become isolated from the main plateau when the intervening rock is removed by erosion. Two major outliers are present north of Battle Creek. These were isolated



LEGEND

- plateau
- knob and kettle
- meltwater channel
- flood plain
- slope scarp
- outlier
- outwash

LANDFORMS

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from the main body of the plateau during Pleistocene times when meltwater from the glacier carved the valley containing Reesor Lake and lower Battle Creek.

Meltwater Channel (Photo 6)

These relict river valleys carved by meltwater flowing from the glacier virtually surround the Cypress Hills plateau. Water pouring into the zone between the melting glacier and the unglaciated plateau coursed around the plateau, eventually flowing out to the south. In the process, it carved the valleys containing Battle Creek, Reesor Lake, Spruce Coulee, Elkwater Coulee, and Medicine Lodge Coulee. Today these valleys contain lakes or streams disproportionately small compared to the valley's size.

Flood Plain

The flat river valley adjacent to the actual stream channel comprises the flood plain; sediments are deposited on the flood plain when the stream overflows its banks. The valleys of Battle and Graburn Creeks constitute the major flood plains within the study area.

Outwash Apron

Outwash apron deposits are mounds of material dumped by meltwater along the edge of the active glacier. The low hills along the north side of the Spruce Coulee are of this origin.

Knob and Kettle Topography

This description refers to a glacial landscape characterized by an abundance of randomly located rounded hills and depressions. The hills were created when sediment present within the glacier settled directly on the land surface as the glacier melted; the depressions were created when isolated blocks of ice buried under the till melted. Although this distinctive landform occurs only north of Reesor Lake within the study area, it is quite prevalent throughout the region north of the Hills.

ECONOMIC GEOLOGY

The principal mineral deposits of economic importance in the Cypress Hills area include: coal, ceramic clay, quartzite cobbles, construction material, oil and natural gas, and uranium.

Coal

In the past small amounts of coal for local consumption have been mined in the vicinity of Elkwater Lake. The best known operation was Raeder's Mine, located to the south of the lake. The coal seam mined occurred about 70 feet below the top of the Eastend Formation; its thickness at the mine was 5.6 feet increasing to 9.7 feet in thickness at an outcrop southwest of the park. Although the coal is of low-rank and erratically distributed, large amounts appear to be present. Its location at the foot of the Cypress Hills plateau means that excessive overburden would be encountered within a very short distance of the outcrop rendering it uncommercial at this time.

Ceramic Clay

The clays of the Whitemud Formation of the Cypress Hills area of Alberta and especially Saskatchewan are the most important source of ceramic clays in Western Canada. These are processed by the clay products industry in Medicine Hat and Redcliff, Alberta. The most visible operation is Quarry No. 34 located northwest of the Park. Although extensively exposed along the flanks of the plateau and accessible for open pit operations, only a small percentage actually has commercial ceramic quality; the quality problems encountered relate to too high a sand or montmorillonite content. The Whitemud

clays are best suited for stoneware clays used for making crocks, jugs, bowls, and sewer pipes; and fire clays used for making retorts, furnace linings, floor tile, terra cotta, and paving brick.

Quartzite Cobbles

In the past, quartzite cobbles from the Cypress Hills Formation were hand picked for use by Cominco in Trail, British Columbia in the grinding of phosphate rock being crushed for fertilizer. This use amounted to several hundred cubic yards of rock material.

Construction Material

Many of the deposits within the Hills contain granular or fill material suitable for construction purposes. Those materials are found in the stream alluvium, the meltwater channel deposits, the outwash and till deposits, as well as the Cypress Hills Formation.

Oil and Natural Gas

The Cypress Hills plateau is flanked by major oil and natural gas production. The hydrocarbons are regionally segregated, with the oil being concentrated in the Jurassic Shaunavon trend east of the Cypress Hills in Saskatchewan; the gas reserves are more abundant west of the Hills in the Lower Cretaceous Bow Island Formation and Upper Cretaceous Medicine Hat Formation. Although several dry holes have been drilled throughout the Hills and in the Eagle Butte structure immediately west of the Hills, the area is currently inactive.

Uranium

Uranium-enriched coal seams are present in the Ravenscrag Formation in the Saskatchewan Cypress Hills. Although these seams attain a thickness of five to six feet near Eastend, Saskatchewan, they are represented in the Alberta Cypress Hills by only a few carbonaceous streaks.

GROUND WATER

SURFACE WATER

WATER QUALITY

● HYDROLOGY

GROUND WATER

Cypress Hills Provincial Park has extensive potential ground water supplies comprised of both major and minor aquifers. These aquifers can, in turn, be related to major and minor recharge areas. In many areas the ground water flow manifests itself in the form of springs. These ground water systems extend throughout the Park, thus providing adequate potential ground water sources for future recreational developments (Map 8).

Major Aquifer

The Upper Cretaceous Eastend Formation which underlies the entire park, except the extreme western tip, constitutes the major aquifer. It is a medium-grained sandstone with a major coal seam about 70 feet below the upper contact and contains numerous shale beds. Wells drilled near the foot of the plateau encounter the Eastend Formation at shallow depth; to tap this aquifer from the bench would, of course, increase the depth of the wells by about 500 feet. All eight wells in the Elkwater area are potentially productive from this formation.

Minor Aquifers

Three types of minor aquifers are present: bedrock formation, flood plain deposits, and meltwater channel deposits.

Bedrock Formation

The Upper Cretaceous Frenchman Formation constitutes a minor, perched aquifer. It is a medium-grained sandstone with excellent aquifer characteristics and would be prospective where underlain by the Battle and Whitemud Formation which would impede downward percolation into the Eastend Formation.

Flood Plain Deposits

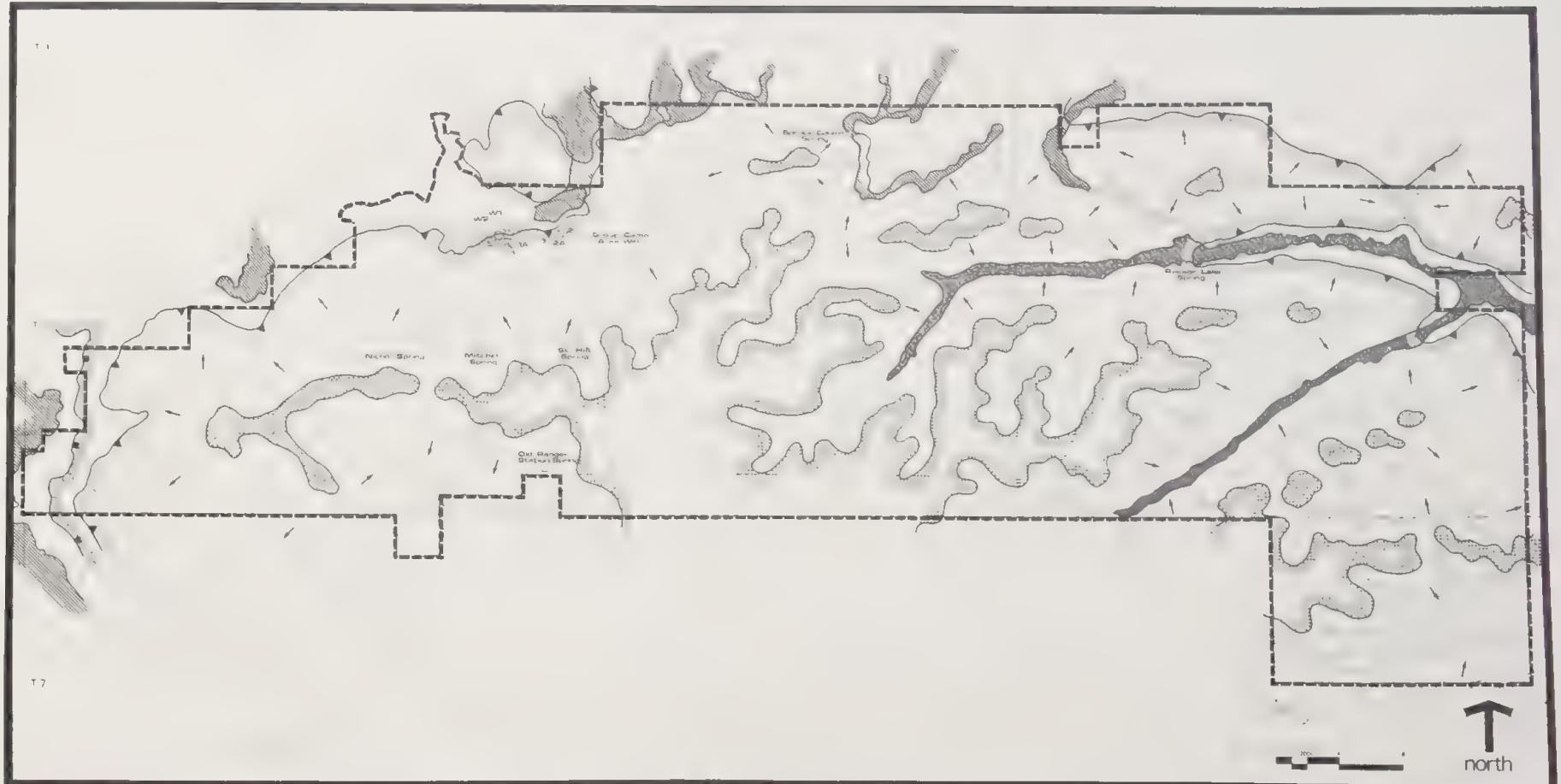
The flood plain deposits of Battle and Graburn Creeks constitute the most extensive aquifers of this type in the study area. Intimately related to surface flow, they benefit from the extensive catchment areas of these two streams. As a result, however, they are more susceptible to contamination from surface water.

Meltwater Channel Deposits

Where the meltwater channels surrounding the plateau still contain a thick layer of sediments, they constitute potential aquifers. The most prospective areas are those meltwater channel segments north of Reesor Lake, along Spruce Coulee, east of Elkwater Lake, and along Medicine Lodge Coulee.

Major Recharge Areas

The major ground water recharge area is the plateau. Rainwater and snowmelt percolate rapidly downward through the Cypress Hills Formation and into the underlying formations, eventually flowing laterally away from the Hills. Along the immediate rim of the plateau the water moves laterally into the minor recharge areas related to each watershed. Further back from the rim, however, the flow is predominately downward into the underlying bedrock formations. This boundary appears to be approximately 75 yards back from the rim; it is indicated by the increasing abundance of shrubby cinquefoil which requires the greater moisture associated with the "zone-of-downward-percolation" versus the rapidly drained "rim-zone". In wet years this boundary would be closer to the edge; in dry years, further back. Springs forming a short distance from



LEGEND

MAJOR AQUIFER
- Eastend Fm

MINOR AQUIFER
- Frenchman Fm
- flood plain
- meltwater channel deposits

MAJOR RECHARGE AREA
- plateau

MINOR RECHARGE AREA
- slope
- direction of ground water flow
- spring
- well

GROUND WATER

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the recharge areas, such as Nichol and Mitchell Springs, are susceptible to comtamination from surface land uses in their immediate recharge areas.

Minor Recharge Areas

Rainwater and snowmelt seeping into the soils and surficial deposits on the wooded slopes moves downslope and can manifest itself as springs, as ground water in the flood plain aquifers, or even percolate downward into underlying bedrock formations. Springs forming where impermeable units are encountered are termed contact springs; Nichol and Mitchell Springs are of this type.

Springs

Although there are numerous springs scattered throughout the Hills, especially during wet years, only six are being extensively utilized: Nichol, Mitchell, Spruce Coulee, Reesor Lake, Ski Hill, and Old Ranger Station. Water from these springs is used locally, except for Mitchell Spring which has been used along with Mitchell Creek to supply water for the Elkwater townsite. The reported flow of these springs is: Nichol (50 igpm), Mitchell (25), Spruce Coulee (25), and Reesor Lake (10).

Wells

Although a number of wells have been drilled in the Park, eight are of current interest: two inactive townsite wells, the Group Camp Area well, and the five wells of the 1973 program.

Old Wells

The townsite wells (1 production, 1 observation) are inactive due to high iron concentration; both wells are capable of producing 20 igpm and can be activated in case of water shortage. (Wells W1 and W2, Map 8).

Group Camp Area Well

This well was drilled in 1972. Tested at 22 igpm, extrapolated data indicates a sustained yield of 90 igpm.

New Wells

The 1973 test program is comprised of five wells (3 production, 2 observation) all with potential water-bearing zones. Well 1A was production tested at 30 igpm for the four month period of July - October; extrapolated data indicates a sustained yield of 40 igpm. (Wells 1, 1A, 2, 2A, and 3, Map 8).

SURFACE WATER

Physical and biological characteristics of the surface waters are an important index of the Park's capability to support certain types of usage. Accordingly, aquatic resources were surveyed in June, 1973, and in October of the same year they were again evaluated, this time in their autumnal condition.

In this report, wetland vegetation (although in many instances associated with open water) is discussed in the Vegetation Section. On the other hand, the truly aquatic vegetation types, emergent and submergent, are dealt with here because, first of all, they do not lend themselves to the kind of mapping employed for terrestrial vegetation and, more importantly, they serve in this section as indicators of the quality and productivity of particular water bodies.

Fish, aquatic mammals, and waterfowl are discussed in the Wildlife Section, whereas aquatic invertebrates (again, because they serve as a direct index of water quality) are included here.

The Drainage Regime

The plateau topography is comprised of 14 discrete watersheds (headwaters) drained by systems of persistent or intermittent streams, some of which incorporate standing water bodies (Map 9). The two most extensive are the Battle and Graburn basins. The Battle Creek system, by means of an artificial diversion, incorporates the Reesor Lake impoundment and is joined by Graburn Creek near the east boundary of the Park. The Spruce Coulee and Elkwater basins also contain substantial bodies of standing water. The remaining watersheds, however, contain no significant standing waters and are drained largely by streams of seasonal or irregular flow.

Standing Water

The character of the terrain and the permeability of the surficial materials tend to prevent the accumulation of small bodies of surface waters which are much less common in the Cypress Hills than in the depressions of the surrounding region. The three large water bodies within the Park are characterized as follows:

Elkwater Lake (Photo 1)

Elkwater Lake is the largest water body in the Park and covers a surface area of about 449 acres. The maximum depth is about 25 feet, with an average depth of about 12 feet. The inlet is in the form of an intermittent stream, Mitchell Creek, and numerous underground springs. A dam at the north end of the lake controls the outlet; overflow from the lake joins the Ross Creek watershed.

Other than a small area at the western tip of the lake which is under cultivation, the surrounding landscape has not been significantly altered. The primary land use of the lake-edge areas outside the Park is unimproved grazing.

The principle emergent vegetation types found in order of abundance are:

Carex rostrata (sedge)
Scirpus spp. (sedge)
Typha latifolia (cattail)
Juncus tenuis dudleyi (rush)
Juncus balticus (rush)

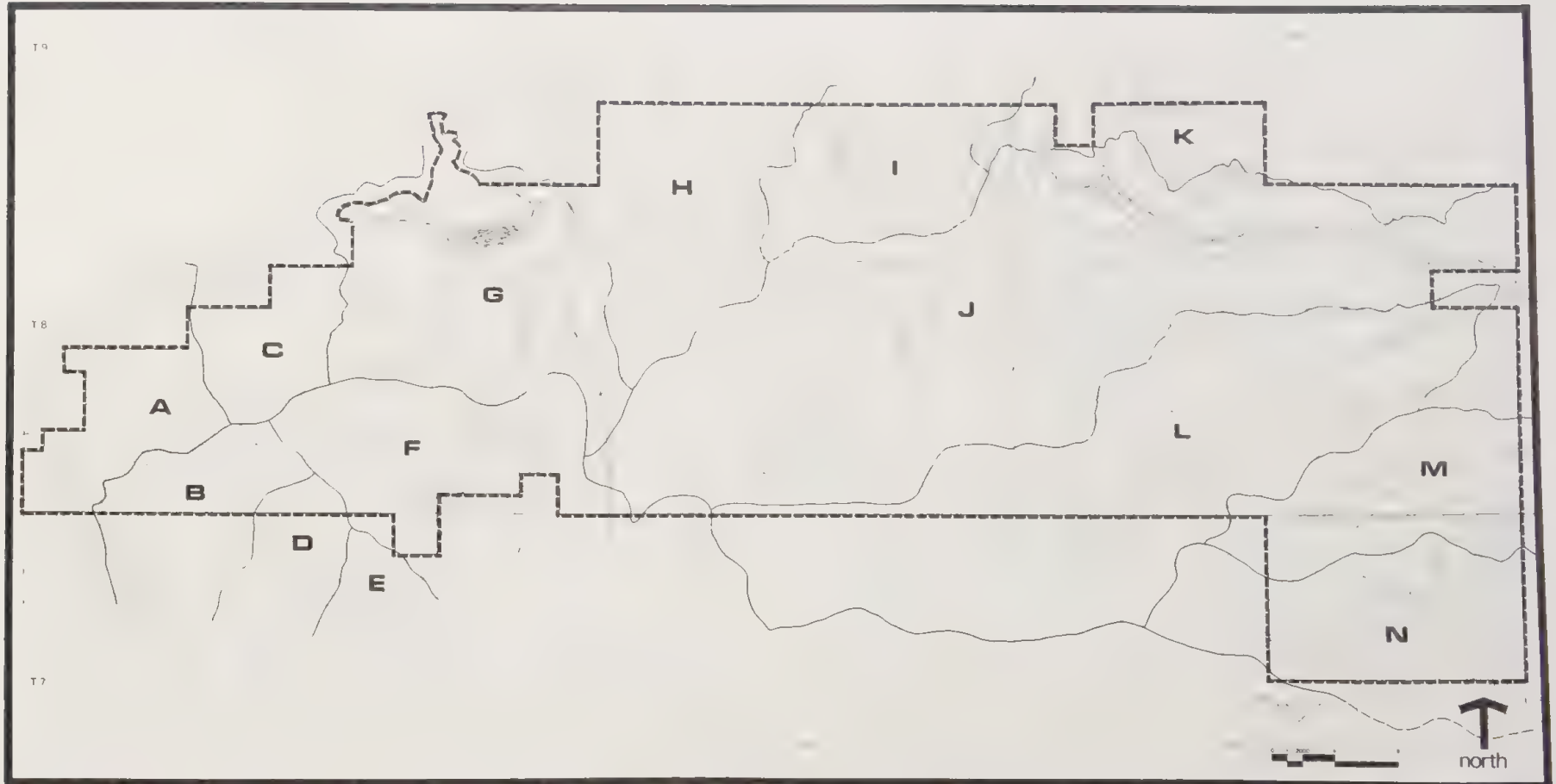
Two species of duckweed are the predominant floating vegetation types; these are:

Lemna miner
Lemna trisulca

A number of plankton types are known to occur in Elkwater Lake, for example, among the phytoplankton, the chlorophyte *Pediastrum* and the diatoms *Fragilaria* and *Stephanodiscus*; among the zooplankton, the loricate rotifer *Anuraea* and the cyclopoid copepods *Cyclops* and *Diaptomus*. The most common benthic invertebrate found was *Gammarus*.

Reesor Lake (Photo 6)

Reesor Lake is a PRFR impoundment constructed in the 1950's. It formerly consisted of two small, shallow lakes known as Twin Lakes. Covering a surface area of about 128 acres, Reesor Lake is about 18 feet deep at the deepest point (at the northern end), averaging around 15 feet in depth overall. The principle inlet is a diverted channel of Battle Creek. Outlet flow is controlled at the east dam, returning to Battle Creek. The main bottom type is mud with the exception of a few rocky areas.



LEGEND

WATERSHEDS

- **A** Bullshead Creek
- **B** Lodge Creek
- **C** Gros Ventre Creek
- **D** Sexton Creek
- **E** Read Creek
- **F** Willow Creek
- **G** Elkwater Lake
- **H** Ross Creek
- **I** Spruce Coulee
- **J** Battle Creek
- **K** MacKay Creek
- **L** Gradburn Creek
- **M** Storm Creek
- **N** Nine Mile Creek

SURFACE WATER

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Emergent vegetation covers less than five per cent of the surface area; the principle species are:

Carex rostrata (sedge)
Carex spp. (sedge)
Juncus tenuis dudleyi (rush)
Juncus balticus (rush)
Typha latifolia (cattail)
Scirpus spp. (sedge)

Submergent vegetation types found here include:

Myriophyllum exalbescens (water-milfoil)
Potamogeton richardsoni (pondweed)
Potamogeton spp. (pondweed)

Spruce Coulee Reservoir

Like Reesor Lake, Spruce Coulee Reservoir was also constructed by PFRA in the 1950's. Covering a surface area of about 51 acres, at its deepest point (the northern tip) it is approximately 23 feet deep; the average depth of the reservoir is about 11 feet. It has an irregular shoreline. Minor inlets and outlets are located at the southern end of the reservoir; springs also contribute to the inlet flow. The bottom type consists primarily of gravels and mud.

Areas of emergent vegetation cover between five and ten per cent of the surface area; two fairly well developed cattail marsh regions are present. Principle emergent vegetation types are:

Carex rostrata (sedge)
Juncus tenuis dudleyi (rush)
Typha latifolia (cattail)
Hippuris vulgaris (mares-tail)
Equisetum spp. (horsetail)

The most common submergents are:

Potamogeton richardsoni (pondweed)
Myriophyllum exalbescans (water-milfoil)

Two species of duckweed were observed; these are:

Lemna minor
Lemna trisulca

Flowing Water

The majority of the streams originating in the Cypress Hills are intermittent. Of the persistent ones, Battle Creek, downstream from Reesor Lake, has the largest mean discharge rate, of nine cubic feet per second, at its confluence with Graburn Creek. Flow in all of the creeks is greatly decreased by late June. The streams inventoried were Bullshead Creek, Lodge Creek, Gros Ventre Creek, Sexton Creek, Read Creek, Willow Creek, Ross Creek, Battle Creek, MacKay Creek, Graburn Creek, Storm Creek, Nine Mile Creek.

Stream Depth

The majority of the streams in the study area are shallow with average early-summer depths of less than one meter. Exceptions to this are in the areas dammed by beaver activity.

Basin Topography

The horizontal configuration of the streams in the study area ranges from straight to curved or sinuous. These are defined as follows:

Straight - no appreciable change over a mile of stream course;

Curved - one or two gentle broad curves per mile;

Sinuous - winding, several bends or changes in direction per mile.

The majority of the streams in the study area can best be termed curved. Battle Creek downstream from Reesor Lake exhibits more sinuosity than any other stretch of stream in the Park.

In terms of watercourse topography, the majority of the stream valleys are "V" shaped. Exceptions to this are Battle Creek and Graburn Creek, which have fairly well developed flood plains.

Bottom Types

Stream bottom types consist principally of gravels and silt. Silty bottom types are particularly prevalent in streams whose watersheds include eroded, north-facing slopes. Battle Creek is heavily silted by materials derived from the Police Point Slump. As a result of this process, many of the beaver dams located downstream from the slump have been almost totally filled in with silt.

Where stream bottom materials are extremely coarse and unsilted (as, for example, along the Upper Graburn) the entire stream may, in periods of low volume flow, disappear into the substrate and reappear at intervals along the stream bed.

Aquatic Vegetation

Both emergent and submergent vegetation types are far less abundant in streams than in standing water bodies. Aquatic vegetation is generally confined to areas of slow moving water.

Emergent vegetation types observed in the streams within the study area are:

Scirpus spp. (sedge)
Carex spp. (sedge)
Equisetum spp. (horsetail)

Principle submergent vegetation types are:

Potamogeton richardsoni (pondweed)
Potamogeton spp. (pondweed)
Myriophyllum exalbescens (water-milfoil)

Water Quality

The ground water and surface water resources of the Park are utilized in various ways where different water quality criteria apply: domestic supply, fisheries, stock and wildlife watering, and recreation. Domestic supply utilizes springs and wells; the "Canadian Drinking Water Standards" criteria apply. Fisheries and animal watering utilize streams, lakes, and ponds; the "Alberta Surface Water Criteria" and various biological water quality criteria apply. Recreational uses focus on the beach area at Elkwater Lake; certain bacteriological criterial apply.

Domestic Supply

To assess the suitability of the various springs and wells for domestic use, the quality parameters (from the Canadian Standards, as applied by the Public Health Department) and analyses are indicated in Table 4 for springs and Table 5 for wells.

With the exception of the iron content of the "old" well, the water quality of the springs and wells within the Park is generally acceptable. The acceptable limit for iron is 0.3 ppm; iron is objectionable because it stains laundry and plumbing fixtures and causes corrosion. The figures for water hardness, although within "acceptable" limits, are above the desirable "objectives" (less than 120 mg/l) of the Federal Government; these readings, however, do not reflect a condition detrimental to plumbing; furthermore, the effects on health may even be beneficial.

The Elkwater municipal system has a long history of bacteriological contamination as suggested by Table 6; this is due to the use of Mitchell Spring and Mitchell Creek as a source of water, since both are readily subject to contamination. This condition has been improving over the past two years and should be alleviated with the completion of the current well drilling program and subsequent use of these wells for the municipal supply.

Fisheries and Animal Watering

To assess the suitability of the various streams, lakes, and ponds for fish and animal use, various biological water quality parameters and analyses are indicated in Table 7 for standing water and Table 8 for running water. The quality of both standing and running waters is within Alberta Standards for surface water. The ammonia reading in Spruce Coulee Pond, however, is high enough to be detrimental to young trout. This may be partly the influence of cattle and partly the result of extensive drainage through leaf mold. Also the pH of Reesor Reservoir is at the upper limit of acceptability for good fishing. The quality of running waters is universally good, apart from a slight trace of ammonia in Battle Creek.

Siltation has affected water temperatures in Battle Creek. The slowing of current velocities and the increase in bottom friction produced a temperature range, in the summer of 1971, of 51 to 76° F. The upper limit of this range is close to being lethal for trout. Siltation has had the added effect of reducing populations of aquatic invertebrates.

Table 4

Water Quality - Springs

PARAMETERS	NICHOL[1]	MITCHELL[1]	SPRUCE[2]	REESOR[1]
pH	6.9	7.1	8.1	6.9
Hardness (ppm)	140	160	240	150
Alkalinity (ppm)	160	180	240	170
Chlorides (ppm)	2	5	17.5	ND[4]
Nitrite (ppm)	ND	ND	ND	ND
Nitrate (ppm)	ND	0.05	5.3	0.02
Iron (ppm)	0.02	ND	0.02	ND
Sulphates (ppm)	14	ND	12	15
Fluoride (ppm)	---	---	0.84	---
Coliform Count/100 ml.	---	---	0	---
Faecal (E.Coli.)/100 ml.	0	0	0	0
Plate Count/ml.	30	3000	1000	30

1. Sampled August, 1969; data Curcio
2. Sampled May, 1973; data Public Health
3. Sampled April, 1973; data Public Health
4. Not detected

Table 5

Water Quality - Wells

PARAMETERS	OLD[1]	GROUP CAMP[2]	NEW[3]
pH	6.9	7.8	7.7
Hardness (ppm)	170	240	240
Alkalinity (ppm)	269	340	390
Chlorides (ppm)	6	7.5	12.5
Nitrite (ppm)	ND[4]	ND	0.13
Nitrate (ppm)	1	3	7
Iron (ppm)	4.5*	0.04	0.17
Sulphates (ppm)	24	4	72
Fluoride (ppm)	---	0.37	---
Coliform Count/100 ml.	---	---	---
Faecal (E. Coli.)/100 ml.	0	---	---
Plate Count/ml.	350	---	---

1. Sampled August, 1969; data Curcio
2. Sampled July, 1972; data Public Health
3. Sampled August, 1973; data Public Health
4. Not detected

* See Text

Table 6

Bacteriological Analyses,
Elkwater Distribution System

PARAMETERS	1973 RANGE	1972 RANGE	1971 RANGE	1970 RANGE
Coliform Count/ 100 ml.	16+	16+	16+	16
Faecal (E. Coli.)/ 100 ml.	0	0	+	+
Plate Count/ml.	3000+	3000+	3000+	3000+

Recreation

Coliform counts in Elkwater Lake (Table 9) are within Alberta Standards for surface waters.

Table 7

Water Quality - Standing Water[1]

PARAMETERS	ELKWATER LAKE	SPRUCE COULEE R.	SPRUCE COULEE R.	REESOR LAKE
Temp. (^{o}F)	63	63	70	63
pH	8.5	7.8	7.4	8.8*
DO (ppm)	8	7 @ 1.5ft 2 @ 16 ft	12	13 @ 1.5 ft. 6 @ 16 ft.
Hardness (ppm)	205	160	150	160
Alkalinity	210	110	140	150
Phosphate	0.09	0.42	0.22	---
Nitrates (ppm)	0.18	---	---	---
Nitrites (ppm)	0.003	---	---	---
Ammonia (ppm)	---	---	0.37*	---
Conductivity (micromhos)	400	260	300	250

1. Sampled June, 1973

* See Text

Table 8

Water Quality - Running Water[1]

PARAMETERS	BATTLE CREEK	GRABURN	STORM	9-MILE	WILLOW	SKI-HILL
Temp. (^{o}F)	59	45	61	58	64	56
pH	7.6/8.5	8.2	7.6	7.3	7.0	8.5/7.1
DO (ppm)	8/10	8	8	6	9	12
Hardness (ppm)	225/220	210	140	90	60	240
Alkalinity (ppm)	150/240	205	140	95	60	230/260
Phosphate (ppm)	0.2/1.07	0.24	0.42	0.19	0.08	------
Nitrates (ppm)	0.35/0.22	0.22	0.35	0.06	------	0.22/0.18
Nitrites (ppm)	------	0.02	0.03	0.005	------	------
Ammonia (ppm)	---/0.01	------	------	------	------	------
Conductivity (micromhos)	320/250	330	250	210	155	325/390

1. Sampled June, 1973

Table 9

Bacteriological Analyses,
Elkwater Lake (Beach Area)

PARAMETERS	1973 RANGE	1972 RANGE	1971 RANGE	1970 RANGE
Coliform Count /100 ml.	5	4.5	70	49
Faecal (E.Coli.) /100 ml.	0	+	+	+
Plate Count /ml.	5000	70	160	3000+

Data: Public Health

TEMPERATURE

PRECIPITATION

WIND

SUNSHINE

OTHER CLIMATIC PARAMETERS

● CLIMATE

In general, the Cypress Hills is cooler, moister, windier, and cloudier than the surrounding prairie. Climatic measurements and phytometric observations show that the Hills are climatically distinct from the rest of southeastern Alberta - the result of which is their attractiveness from a recreational and renewable resources point-of-view.

TEMPERATURE

Mean annual temperature for the Cypress Hills is about 36.5 degrees F (Table 10). August, the warmest month, has a mean of 62.4 degrees F and January, the coolest month, exhibits a mean temperature of 10.4 degrees F

Daily mean temperatures of 42 degrees and 32 degrees F respectively, indicate the transitions into and out of summer and winter (Figure 1). On this basis, there are five months each of summer and winter with April and October representing the months of Spring and Autumn.

Frosts have occurred as late as 12 July and as early as 17 July in the Hills. The average dates, however, are 18 June and 3 August, resulting in an average growing season of 46 days. The longest growing season on record was 96 days (30 May to 3 September). It can be seen that both diurnal and annual temperature ranges are great. This is due both to the aridity and to the elevation of the Hills.

Medicine Hat and Swift Current display higher mean temperatures, on an annual basis, than do the Cypress Hills. Both stations exhibit even greater diurnal and annual temperature ranges than do the Hills. This is probably due to their lower elevation and less favourable moisture status.

PRECIPITATION

Precipitation data collected at Battle Creek Ranger Station between 1919 and 1931 indicates that average annual precipitation in the Hills for those 13 years was 18.5 inches, as compared to averages of 14.29 inches at Medicine Hat and 15.27 inches at Swift Current. Seventy per cent of the total precipitation (12.9 inches) comes in early summer, especially May and June; 25 per cent (4.62 inches, 46.2 inches of snow) comes in the form of snow. This 46 inches of snow compares with 48.7 inches in Medicine Hat and 44.4 inches at Swift Current. Moisture deficit ranges from four to eight inches in the Hills. This is a somewhat more favourable moisture status than those of Medicine Hat (-10.98) and Swift Current (-7.17).

WIND

There is no data available for winds at the Cypress Hills. The nearest stations for which data is available are Suffield, Alberta (Table 11), and Swift Current (Figure 2). Wind comes most often from the southwest, west, and east (descending order). The strongest winds are from the southwest, northwest, and west. At Swift Current, January is the windiest month and July the most calm. It is probable that these patterns are similar to those at Cypress Hills, however, winds are undoubtedly stronger on the plateau and less effective in the forested coulees.

SUNSHINE

As with wind, sunshine data for this report is gleaned from summaries for Southern Alberta and Southwest Saskatchewan, sunshine data calculated for Cypress Hills is found in Table 12. Cloud cover is greatest in June and least in July (Figure 3). Late summer (July to October) presents the greatest amount of sunshine due to the reduced cloud cover (Figure 4). Mean daily solar radiation at Suffield and Swift Current (Figure 5) also show a pattern similar to that of hours of sunshine. These patterns are probably similar to those at Cypress Hills, however, the amount of cloud cover is likely greater in the Hills due to the orographic nature of cloud formation there.

OTHER CLIMATIC PARAMETERS

There is no data to provide information concerning other climatic parameters. Storms and fog are undoubtedly most frequent in the spring and early summer, when the cloud cover is greatest, and in winter when temperatures are conducive to the formation of ice fog. Incidence of fog, however, is low because of the semi-arid climate.

Microclimatic zonation can be delineated into three zones: north and east facing slopes, south and west facing slopes, and the plateau. These zones are best shown by the vegetation. North and east facing slopes accumulate large amounts of precipitation both in summer and winter due to the prevailing winds and the snow-catching effects of the forest vegetation. South and west facing slopes are blown clear of snow in winter and also receive less precipitation in summer than do other slopes; they are further affected by the dessicating effects of wind and solar radiation. This climatic difference is shown by the fact that vegetation on south and west facing slopes consists of short-grass prairie types for the most part, while the north and east facing slopes are forested. The third microclimatic zone is the top of the plateau. This area has a moisture status which is intermediate between the forested zone and the short-gras prairie zone. The native vegetation in this zone is fescue grassland, indicating favourable moisture conditions. In fact, the moisture conditions are comparable to many forested areas in Alberta and this area would probably become forested if protected from grazing and fire.

Snow depth, as mentioned above, is greatest in the forested areas, almost nil on the short-grass prairie lands, and intermediate on the plateau. Accumulation in the forest exceeds five feet and is from two to four feet on the plateau - based on phytometric indicators.

Table 10

Temperature Data

STATION	ELEVATION	MEAN ANN.	MEAN DAILY MAXIMUM				MEAN DAILY MINIMUM				FROSTS	
			Jan.	Apr.	Jul.	Oct.	Jan.	Apr.	Jul.	Oct.	Last	First
Cypress Hills /1	4800	36.5	18.4	42.4	69.3	44.8	2.5	25.6	47.5	28.4	18 June	3 Sept.
Medicine Hat /2	2365	41.5	22.4	55.0	83.1	57.7	1.8	31.4	55.1	33.2	14 May	20 Sept.
Swift Current /2	2707	38.5	17.5	48.7	79.0	53.3	-0.3	28.7	54.8	32.5	30 May	22 Sept.

1. Holmes, 1972

2. Longley, 1972

Table 11

Mean Daily Wind Speed and Direction, Suffield 1955 - 66

DIRECTION	JANUARY		APRIL		JULY		OCTOBER		YEAR	
	F	S	F	S	F	S	F	S	F	S
N	10	11.4	12	13.3	9	9.9	9	11.6	11	11.6
NE	6	8.1	8	11.0	8	10.0	5	9.7	7	9.7
E	15	9.3	15	10.2	16	9.7	8	8.6	14	9.5
SE	6	7.9	9	10.1	10	8.5	9	9.3	8	8.9
S	10	11.8	12	12.4	11	9.9	15	12.4	12	11.6
SW	21	13.7	17	13.3	16	11.9	25	14.5	19	13.2
W	17	10.4	15	14.9	17	11.9	18	12.8	16	12.3
NW	14	11.4	12	14.1	13	12.2	10	12.1	13	12.6
CALM	1		*		*		*		*	
ALL DIRECTIONS		10.9		12.6		10.7		12.2		11.5

F - Direction, frequency in per cent
S - Speed, m.p.h.
* - Less than 0.5 per cent
Data: Longley, 1972

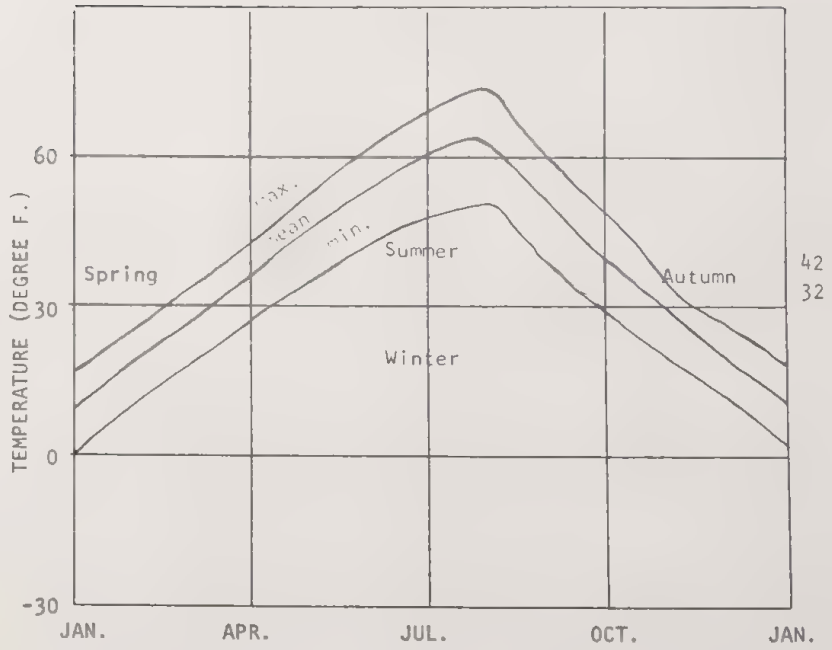
Table 12

Sunshine Data - Cypress Hills

	MEAN DAY LENGTH (HRS)	SUNRISE (STD TIME)	SOLAR NOON (STD TIME)	SUNSET (STD TIME)
JAN	8:51	8:05	12.31	17:04
FEB	9:91	7:31	12:35	17:42
MAR	12.14	6:34	12:30	18:27
APR	14:00	5:28	12.21	19:08
MAY	15:17	4:36	12.18	20:20
JUNE	16:14	4:15	12:22	20:29
JUL	16:03	4:33	12:27	20:21
AUG	14:18	5:06	12:25	19:40
SEP	12:39	6:17	12:16	18:38
OCT	10:55	6:53	12:07	17:31
NOV	9:27	7:34	12:06	16:39
DEC	8:12	8:07	12:17	16:23

Figure 1

Mean Temperatures at Cypress Hills



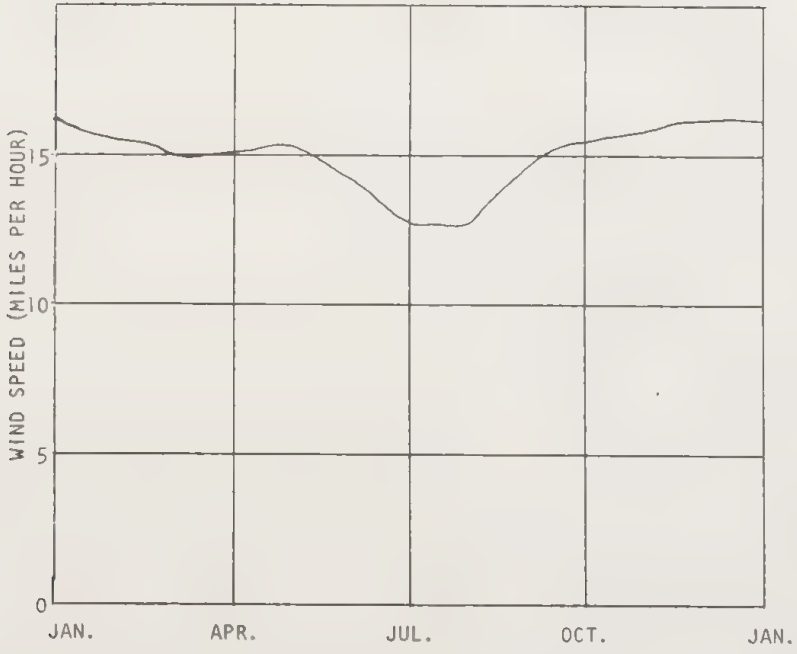
Yearly Averages

MAXIMUM	45.3
MINIMUM	27.7
MEAN	36.5

Data: Holmes, 1972

Figure 2

Wind Speed at Swift Current

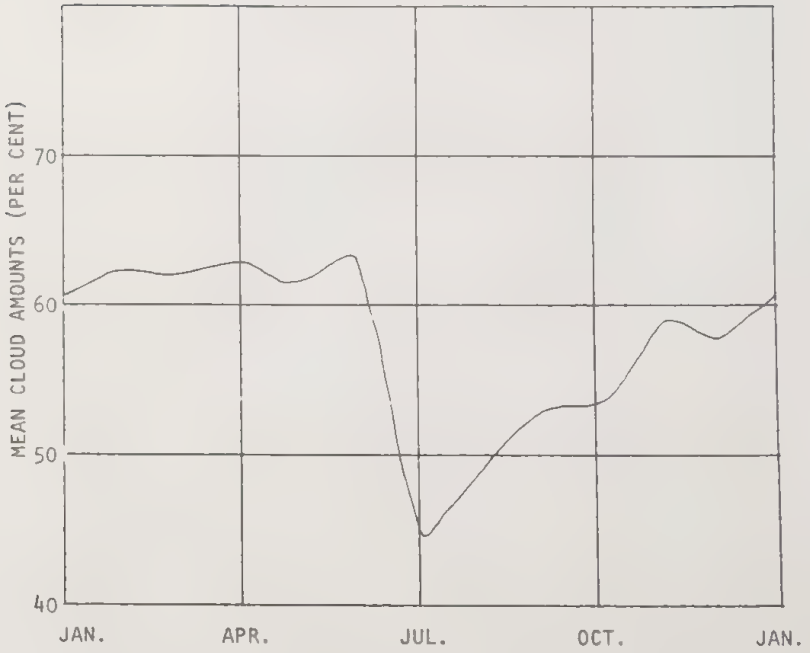


Data: Longley, 1972

Figure 3

Cloud Cover in Southern Alberta

and Swift Current (6 Stations)

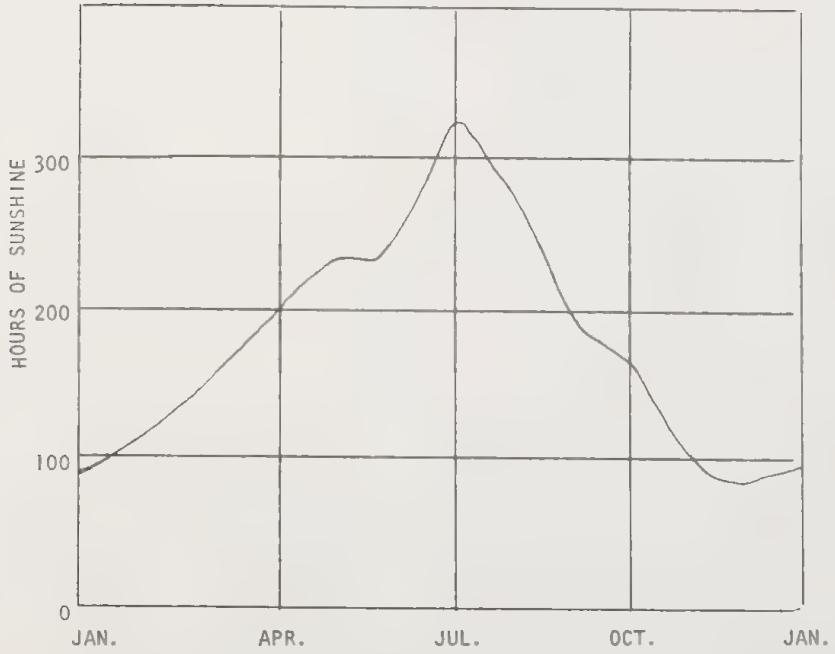


Data: Longley, 1972

Figure 4

Mean Monthly Hours of Sunshine

Southern Alberta and Southern Saskatchewan
(17 Stations)

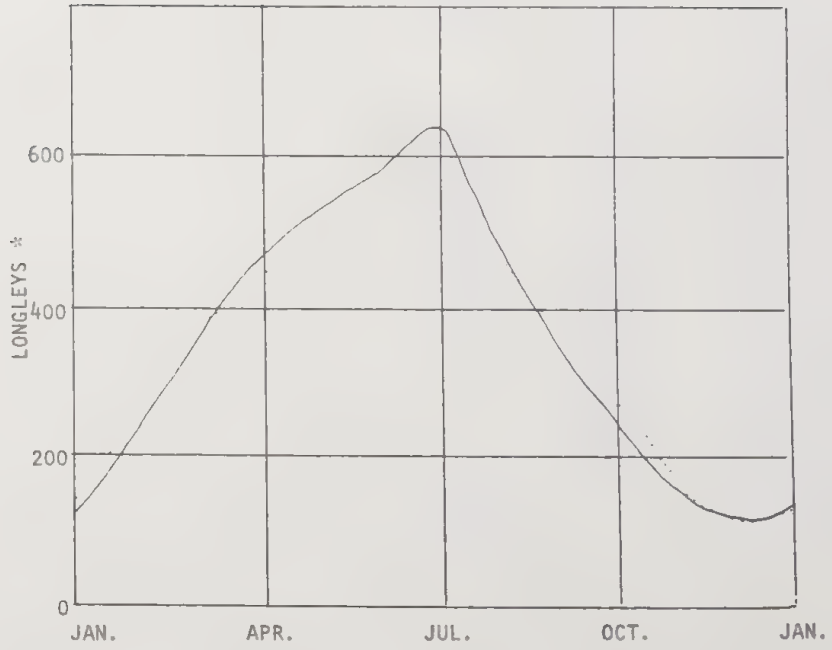


Data: Longley, 1972

Figure 5

Incoming Solar Radiation

At Suffield and Swift Current



Yearly Average

SUFFIELD -——— 342
SWIFT CURRENT ····· 344

* LONGLEY = $\frac{1 \text{ G. CAL}}{\text{CM}^2 \quad \text{SEC.}}$

Data: Longley, 1972

BIOLOGICAL RESOURCES

HABITATS

VEGETATION COMMUNITIES

VALLEY BOTTOM HABITAT TYPE

NORTH-FACING SLOPE HABITAT TYPE

SOUTH-FACING SLOPE HABITAT TYPE

PLATEAU HABITAT TYPE

OTHER VEGETATION TYPES

SUCCESSIONAL TRENDS AND PRESENT CONDITIONS

INTERESTING AND UNIQUE FEATURES

● VEGETATION

The vegetation of the Cypress Hills can be divided into 12 community types which occur in four general habitat types. The habitats are as follows:

1) Valley bottoms

2) North-facing valley slopes

3) South-facing valley slopes

4) Plateau

In order to adequately describe the communities, it will be necessary to describe the habitats in some detail and to then describe the community types as they relate to environmental gradients, such as moisture, within each habitat.

HABITATS

The four habitat types mentioned above represent a moisture gradient of sorts. Valley bottoms and north-facing slopes are the wettest areas, and the plateau and south-facing slopes are the dryest. Of interest is the fact that the plateau is not the dryest area. In most cases, flat expanses of land tend to be drier than adjacent slopes. In the Cypress Hills, however, the plateau is several hundred feet above the surrounding prairie, an elevation difference which causes vegetation on the plateau to be similar to that which occurs naturally several hundred miles to the north and west.

Valley bottoms are probably the most limited topographical feature in the Cypress Hills. Except for the areas of Spruce Coulee and Reesor Lake, valley bottoms are characteristically narrow. In addition they have been subject to serious stream downcutting in the recent past as well as at present. As a result, except in the lower ends of the valleys, the soils are more well drained than would ordinarily be expected, and expanses of marsh and swamp vegetation are very limited in extent. In most cases, wetland communities are not related so strongly to poor soil drainage as to the presence of springs at the foot of slopes.

North-facing slopes are characteristically moist due to their protection from direct solar radiation and to the fact that they accumulate precipitation which is deposited in the wind shadows of the upland areas. As a result, these slopes are usually cool, moist, forested areas, and they are the most distinct areas of the Hills from a visual point of view.

South-facing valley slopes are very dry due to their exposure to sunshine and winds. These slopes are usually blown free of snow in winter. Vegetation is dominated by shrubs and herbs. Grassland on these slopes is similar in composition to that of the surrounding prairies due to the very dry nature of south slopes in relation to the remainder of the Cypress Hills.

The plateau, as mentioned above, is more moist than south-facing slopes, yet drier than north-facing slopes. As a result, the native vegetation there is fescue grassland - a tall grass vegetative type. In addition to the effects of altitude, the tall grass and shrubs on the plateau collect large amounts of rain and snow and prevent dessication of the soil, thereby causing the moisture status of the plateau to be favorable.

VEGETATION COMMUNITIES

Vegetation communities are shown on Map 10 and listed in Appendix 1. Each community is described below in terms of its habitat association and environmental factors. It must be remembered that some community types are present in more than one habitat type and that for this reason, some communities are listed more than once.

Photo 7. Valley bottom (Battle Creek) wet meadow and shrub communities with forested north-facing slope in background; forest composition is white spruce, lodgepole pine and aspen poplar.

Photo 9. South-facing slope along Jackpot Road showing grassland and shrubland communities. Note forested north-facing slope in background. (See photo 6 also.)

Photo 8. North-facing slope showing effects of moisture gradients with aspen poplar and shrub communities in drier areas and white spruce in wetter areas.

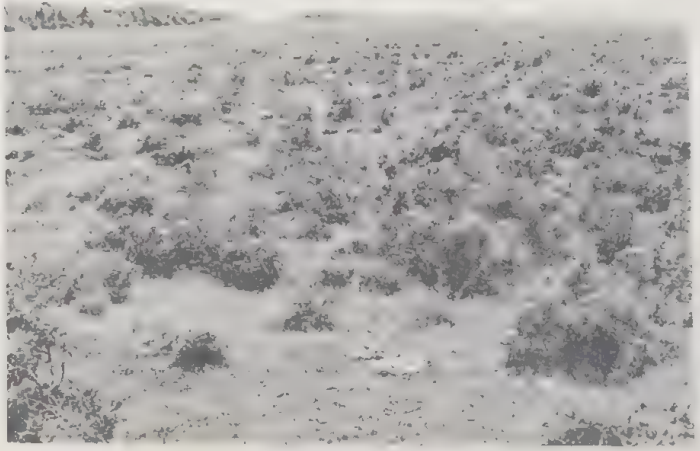


Photo 10. Plateau grassland with heavy incursion of shrubby cinquefoil due to overgrazing.

LEGEND

FOREST

- Aspen
- Spruce
- Pine
- Mixed
- Man

NON-FOREST

1 Marsh wet meadow
2 Valley bottom grass shrub
3 Willow currant cow parsnip
4 Willow sedge
5 Mixed grassland*
6 Fescue grassland*
7 Grassland Shrub
8 Shrubland
9 Aspen groveland
* (see grassland maps)

WATER ASSOCIATION

w
x
y
z

VEGETATION

10

CYPRESS HILLS PROVINCIAL PARK

Alberta

Lombard North Group

MARSHALL MACKLIN MONAGHAN LTD

VALLEY BOTTOM HABITAT TYPE (photo 7)

Valley bottom communities consist of the following types:

1) Marsh grading to wet meadow

2) Willow / sedge

3) willow/currant/cow parsnip

4) Valley bottom grass/shrub

Marsh and wet meadow communities are located on river floodplains and near lakes and ponds. These are areas where the water table is at or near the soil surface during more than six months of the year. The plant species occurring in these communities (Appendix 1, Section C) consist of sedges, rushes, and grasses as dominants. Soils are shallow organic types.

The two willow communities (Appendix 1, Section D) are found in somewhat better-drained areas. Wet meadow communities grade into willow/sedge communities which grade into willow/currant/cow parsnip communities as drainage improves. In most cases, willow/sedge communities are dominated by short willows (0 - 6 feet) while willow/currant/cow parsnip communities are dominated by tall willows (6 - 12 feet). In both cases, understory vegetation consists of sedges, rushes, and reedgrass; drier tall willow communities also have an abundance of currants and cow parsnips. Soils are gleysolic with the willow/sedge communities having a greater depth of organic matter than the willow/currant/cow parsnip communities.

Valley bottom grass/shrub communities occur in the most well-drained valley bottom sites. A large number of shrub types occur, including willow, hawthorn, rose, buckbrush, currant, red osier dogwood, and choke cherry. There is also a large number of herbaceous species, including reedgrass, yarrow, milkweed, dandelion, geranium, strawberry, violet, nettle, thistles, chickweed, false burgamot, and rough fescue. In many instances this type grades into grassland shrubland, an upland vegetation type, without a noticeable boundary. A more complete species list can be found in the Appendix 1, (section E). These shrub communities have particular usefulness in terms of the capability to supply wildlife forage. Soils are well-developed chernozemic loams.

NORTH-FACING SLOPE HABITAT TYPE

Communities found on north slopes are mostly forest communities. Although there are several types of forest mixtures in the Cypress Hills, they will be discussed in terms of the dominant forest species: spruce forest, pine forest, and aspen forest. The latter type also grades into aspen groveland, which will be discussed in a section below.

Spruce forest is generally the oldest forested community type in the Cypress Hills. It is the final stage in natural succession in which white spruce (Picea glauca) has invaded older forests and has become dominant by shading out competing species. As a result of the shade factor, the forest understory (Appendix 1, Section J) is generally sparse. Wildlife capability is limited to shelter only and extensive use of the forest is made only near ecotonal areas. Soils are young luvisols.

Pine forest, dominated by lodgepole pine (Pinus contorta, variety latifolia) is a fire-successional community type (Appendix 1, Section I). In most cases the lodgepole pine is being succeeded by white spruce since the pine is not able to regenerate in the forest. An exception is the stand of "doghair pine" near the golf course. This stand consists of very closely spaced trees and has not yet been invaded by spruce, which will not come into the forest until some thinning (natural or otherwise) of the stand has occurred. Pine forests are only slightly better than spruce forests as wildlife habitat. The soils are luvisolic regosols, consisting largely of colluvium.

Aspen forests in the Cypress Hills (Appendix 1, Section H) are also fire successional to some extent. They are also adapted to dry sites and are often found as bordering areas between coniferous forests and shrublands (Photo 8). In many cases, white spruce is not invading the aspen stands because of the dryness. They may be invaded in the future, however, due to the microclimatic effects of the aspen. Aspen stands are the best of the forest types for game forage as the tender young trees are favored by moose, especially when heavy snow precludes other forage. It appears that aspen is invading grassland and shrubland areas, probably because of fire protection in the park. As a result, some aspen stands occur on chernozemic soils which will slowly become more luvisolic due to the forest cover.

SOUTH-FACING VALLEY SLOPE HABITAT TYPE

There are four major vegetation categories on south slopes:

1) Mixed grassland

2) Grassland shrubland

3) Shrubland

4) Aspen groveland

These types coincide with environmental moisture gradients, with the wettest types occurring at the tops and bottoms of the slopes.

Grassland, grassland shrubland, and shrubland (Appendix 1, Section E) are really phases of a single dryland vegetation type (Photo 9). They all occur as a mosaic of small (less than one hectare) patches of pure grass, pure shrub, and mixed stands. The grassland differs from the plateau in that it is an Agropyron-Stipa short grassland, resembling the surrounding prairie, as opposed to a tall Fescue grassland. All of this south-facing exposure is good elk winter range because it provides varied vegetation and is blown free of snow in winter.

Aspen groveland stands, consisting of widely spaced groves intermingled with grass, is the fourth vegetation type (Appendix 1, Section G). This type provides good wildlife habitat as it consists of vegetation giving both forage and shelter to the animals. Soils, as with the other south slope types, are chernozemic.

PLATEAU HABITAT TYPE

The plateau is probably the most valuable vegetation zone in the Cypress Hills. It is one of the few examples of native tall fescue grassland in Alberta. The fescue provides extremely good pasturage for wildlife and cattle. Vegetation on the plateau (Appendix 1, Section F) is dominated by rough fescue, shrubby cinquefoil, and lupines (Photo 10). Also present are considerable numbers of wild flowers. The plateau was heavily grazed by buffalo in the past and is used today by cattle and by moose and elk along the forest margins.

Along the north and east edges of the plateau, forest has encroached, indicating that protection from grazing and fire would alow the plateau to become extensively forested. In fact, it appears that the plateau has been extensively forested several times since glaciation as indicated by the polygenetic soils on portions of the plateau. Soils of the plateau, however, are generally chernozemic.

OTHER VEGETATION TYPES

Two vegetation types not discussed are the vegetation occurring in ponds and streams (Appendix 1, Section B) and roadside and introduced species (Appendix 1, Section A). Both types are limited in extent and few generalizations can be made concerning either type.

SUCCESSIONAL TRENDS AND PRESENT CONDITIONS

At present, valley bottoms appear to be becoming better drained and succeeding towards shrub and forest communities. Willow is being kept out by moose overbrowsing and there are areas where the shrubs are extensively browsed, especially along Battle and Grayburn Creeks.

Valley slopes show signs of severe overgrazing and overbrowsing, possibly due to the competition between cattle and elk for winter range. In some cases, aspen have been girdled by elk stripping bark off the trees. Forested areas are generally oversteepened, unstable slopes due to the large number of springs and rapid down-cutting of present streams. It is unlikely that vegetation will succeed in stabilizing the slopes.

On the plateau, overgrazing is particularly evident in many areas where grass carryover is less than 15 per cent. Signs of past range overuse are seen in the large amounts of shrubby cinquefoil and wild flowers on the plateau. A relative evaluation of certain grassland characteristics is mapped in Appendix 2.

INTERESTING AND UNIQUE FEATURES

The most famous of the unique features of the Cypress Hills is the presence of 14 species of orchids. Of these, three occur in wet meadows and marshes, four in spruce forests, three in pine forests, three in aspen communities, and one is not identified by habitat. The best places to look for large numbers of orchids are in wet springy places in spruce forests.

Another feature, the one which gave the Hills their name, is the extensive forest. These are the only large stands of trees for more than 100 miles in Alberta.

Perhaps the most interesting unique feature in the Cypress Hills is the occurrence of native tall fescue grassland on the plateau. This is possibly the largest stand of such grassland in Alberta. If allowed to revert to native grassland through reduced grazing and reduced fire protection, this area could become a really unique and interesting ecological entity.

FOREST SOILS

GRASSLAND SOILS

POLYGENETIC SOILS

SOIL OCCURRENCE

INTERESTING AND UNIQUE FEATURES

FRAGILE FEATURES

●SOILS

The soils of the Cypress Hills can be divided into three main categories: forest soils, grassland soils, and azonal soils. The soils history in the Hills is complex and present soils have evolved, in many cases, under the influence of grassland and forest vegetation due to fluctuations in treeline at different times. This is true on much of the plateau. Because of this situation, soils will be discussed in the three categories mentioned above as well as forest soils developed on grassland soil and grassland soils developed from forest soil (polygonetic soils). Appendix 3 contains detailed profile descriptions of the various soil types described below.

FOREST SOILS

Soils developed under stands of aspen, pine, and spruce fall into the Grey-wooded Group. Jungerius (1969) has described these soils as having a thin organic surface horizon (A1) over a platy-structured, light-colored, eluviated A2 horizon and a dark-colored B2+ horizon with a blocky structure. Newsome and Dix (1968) have found that these true grey-wooded (podzolic) profiles are found only occasionally and that most forest soils in the Cypress Hills are azonal. That is, these soils are so immature that they cannot be considered true grey-wooded soils; further, parent material for nearly one-third of the forested sites is gravel.

GRASSLAND SOILS

Every researcher has noted the altitudinal zonation of grassland soils which occurs in the Cypress Hills and resembles the latitudinal zonation found elsewhere in Alberta. This progression from brown to dark-brown to black soils is a result of increasing moisture efficiency with altitude. All of the non-forested soils fall into the Chernozemic Group. The differences in color are related to organic accumulation which increases with favourable moisture status.

Jungerius (1969) describes the Chernozemic soils of the Cypress Hills as having a dark-coloured organic surface horizon (as thick as 10 inches) over a brown B2 horizon with a weak prismatic structure.

POLYGENETIC SOILS

As forest invades grassland, changes in type of organic material causes degradation of organic matter in the surface soil. As a result, leaching of the dark A1 horizon causes it to become lighter in colour. Jungerius has noted the salt-and-pepper appearance of the soil in early stages of this process which, he says, may be confused with recent aeolian deposition. Eventually, the only remnant of the original Chernozem is the blocky prismatic B2 horizon in the subsoil.

When grassland replaces forest, however, the result is an accumulation of organic matter and a deepening of the A1 horizon of the forest soil. The platy structure of the forest soil remains for a long time, and the B2+ horizon remains largely unaffected.

SOIL OCCURRENCE

Present climatic conditions favour invasion of grassland by trees. As a result, forest soils near the grassland ecotone are polygenetic grey-wooded soils formed on relict Chernozems. The adjacent grassland on the plateau was formerly a forested area (Jungerius, 1969) and is, therefore, a Chernozem formed on grey-wooded soil. Most soil on the plateau is of that type.

Soils within the forest and soils of the mixed-grassland and grassland-shrubland communities are monogenetic grey-wooded and Chernozemic soils respectively. Valley-bottom soils are organic luvisols formed from alluvial and colluvial sediments.

Mapping of the topsoil, for the purposes of this report, was accomplished by the use of the computer. The soil mapping model stressed textures in anticipation of the need to evaluate potential erodibility and was based on data from the surficial deposits map, the vegetation map, the slopes map, air photo interpretation, site observation, and test pits; it is discussed in the Analysis Section.

INTERESTING AND UNIQUE FEATURES

The polygenetic soils on the plateau are relatively rare in Alberta and are the product of numerous fluctuations in climate and treeline.

FRAGILE FEATURES

The loess cap on the plateau is very fragile and sensitive to wind erosion if the vegetative cover is broken. Many of the colluvial soils on steep slopes (>10%) are very susceptible to movement and should be considered when planning trails and campsites.

MAMMALS

BIRDS

AMPHIBIANS AND REPTILES

UNIQUE WILDLIFE HABITATS

FISHERIES AND THE AQUATIC HABITAT

For the purposes of this inventory, the wildlife of the Cypress Hills has been divided into the following groups: mammals, birds, reptiles, amphibians, and fish.

Information on wildlife contained within this report was gathered from provincial government documents, published papers, discussions with government employees, and field studies carried out during the spring and summer of 1973.

There was considerable variation in the quantity and quality of information available on each species. Therefore, since some species are dealt with in more detail, this discussion may appear biased. This does not necessarily mean, however, that these species will warrant more attention during the analysis phase of this study.

The wildlife which can truly be called "characteristic" of the Cypress Hills is that part of the fauna which is not to be found in the surrounding short-grass prairie biome. The topographic prominence of the Hills results in its being climatically distinct; this is reflected, in turn, in the types of vegetation found in the Hills; and because of these vegetation types, certain characteristic faunal types are found in the area.

Information on the various wildlife species of the Cypress Hills considered pertinent to this inventory is:

1) Provincial distribution and rarity.

2) Regional distribution.

3) Location and numbers within the park.

4) Habitat preferences.

5) Limiting factors.

Grouping wildlife on the basis of habitat types was not attempted in this inventory. This type of grouping can be generated by combining vegetation information with wildlife information. A prerequisite to this, however, is good information on the habitat requirements of the individual species. Also, it is known that a great many species utilize edge areas, that is, they select certain combinations of features rather than being restricted to one homogeneous vegetation type.

Rather than arbitrarily selecting certain species to be discussed an attempt is made to inventory all species on an equal basis. This information should then point to the species which require special consideration during the analysis and planning phases of this study.

For the purpose of readability, scientific names have been omitted from the text, but are listed in Appendices 4 through 6. For the same reason, reference notations are omitted from the text.

MAMMALS

Forty-five species of mammals are known to occur in the general vicinity of the Cypress Hills of Alberta. They belong to fourteen different families. A large number of these species, however, are associated with the short-grass prairie biome and therefore should not be considered as part of the characteristic indigenous fauna of the Hills.

Some species have generated considerably more interest than others. This is particularly obvious in the case of ungulates. Their size and the fact that they are a "huntable group" has meant that they have received more attention than other wildlife groups from government agencies.
For the majority of mammals in the area, information on distribution and habitat requirements is sketchy at best.

Photo 11. The Reesor Hills are an important wintering area for elk, mule deer and white-tailed deer.

Photo 12. Small meadows enclosed by mixed forest is the preferred habitat of broad-winged hawks.

Photo 13. Wetland shrub habitats support a wide variety of birds including unique species like the MacGillivray's Warbler.

Photo 14. Cattail marshes are rich in wildlife. They provide nesting cover for numerous bird species including the red-winged black bird and pied-billed grebe.

Shrews

Only two species of shrew occur in the Cypress Hills of Alberta. These are the cinereous shrew and the dusky shrew. The cinereous shrew is the most widely and commonly distributed shrew in the province, occurring throughout Alberta. According to Soper, it is likely to occur in all vegetation types within the park except grassland areas. The dusky shrew is generally confined to the wooded regions of the province. In the Cypress Hills area it is likely to be found in damp stream and pond-side willow thickets.

Bats

There is some discrepancy in the literature as to the number of species of bats that occur within the Cypress Hills.

Soper lists four species. These are: the pale big-eared bat, the Say masked bat, the pale big brown bat, and the eastern red bat. All species but the pale big brown bat occur only in the southern half of the province. None are unique to the Cypress Hills, although all are probably more common here than in the surrounding prairie biome. No information on habitat preference of individual species was available.

Hares and Rabbits

Three species belonging to this family occur in the study area. These are the white-tailed prairie hare, the varying hare, and the Black Hills cottontail. The white-tailed prairie hare is the most commonly observed member of this group in the area; it is also found in the surrounding grassland biome and in the aspen parkland. Both the varying hare and the Black Hills cottontail are woodland species. The varying hare is generally not found in the surrounding biome, but is common to other non-grassland biomes within the province. Its population fluctuates in a cyclic fashion. It is not known how common it is at present within the park. The main predator of the varying hare throughout the boreal forests of North America is the lynx. Therefore, it is probable that within the Cypress Hills the number of lynx will fluctuate according to the number of varying hare. The Black Hills cottontail is found in areas in Cypress Hills, principally in woody and brush stream and river bottoms. Several cottontails were sighted within the balsam poplar vegetation type in the park during field work in the spring of 1973.

Marmots and Squirrels

Four members of this family occur within the Cypress Hills. These are the Richardson's ground squirrel, the striped ground squirrel, the little northern chipmunk, and the red squirrel. The Richardson's ground squirrel is the most common and wide ranging of this group in the province. They occur in the grassland and the aspen parkland. Within the park, they will be found in grassland areas. The distribution of the striped ground squirrel within the province generally follows the aspen parkland. In the park, it is most likely to be found in long grass (fescue, etc.) and brush areas. The little northern chipmunk and the red squirrel occur within the coniferous forest region of the park. Other subspecies of these are found in mountain and boreal forest biomes of the province, but ranges do not extend into grassland regions of the province. The red squirrel which appears to be the more common of the two species is thought to be exotic to the region; it was apparently introduced to the Saskatchewan side in the early 1900's.

Pocket Gophers

The Anderson pocket gopher is the only member of this family found in the Cypress Hills. In Alberta they are generally distributed throughout the aspen parkland biome. Prime habitat is mostly associated with black loamy soils. Therefore, Richardson's pocket gophers are probably not common to the surrounding short-grass prairie biome.

Pocket Mice and Rats

Two members of this family have been recorded in the general vicinity of the Cypress Hills, although not in the hills themselves. These are the Maximillian pocket mouse and the Montana kangaroo rat. The habitat preferred by both these species is the dry short grass prairie. Therefore it is highly unlikely that they would be found in the Cypress Hills Provincial Park.

Beavers

The Missouri River beaver is commonly found in the Cypress Hills. Beaver dams and lodges occur on all major streams in the Hills. Field work in 1973 indicates they are particularly prevalent along Battle Creek, Willow Creek, and Storm Creek. Evidence of old beaver activity was also noted on certain reaches of Medicine Lodge and Nine Mile Creeks. Many of the streams are damned in order to provide sufficient depth of water for over-wintering. (The flow of Graburn Creek was observed to be halted by beaver damning). Beaver were also observed at Spruce Coulee Reservoir (two lodges located), and Reesor Lake (one lodge located).

The primary food source of beavers is aspen and balsam poplar, paper birch, and various willows.

Native Mice and Rats

Ten members of this family are found in the general vicinity of the Cypress Hills. Six of these: the prairie harvest mouse, the Osgood white-footed mouse, the Badlands white-footed mouse, the Audubon's grasshopper mouse, the Badland's meadow vole, and the pallid vole, show a preference for the arid short grass prairie type of habitat, and therefore are unlikely to be found in the study area.

The bushy-tailedwood rat typically inhabits rock slide areas and forested stream bank regions. They are primarily a nocturnal animal and their relative abundance in park areas is not known. Their distribution in the remainder of the province is limited to the mountain and foothills zones.

The plains red-backed vole can be found in spruce and mixed wood forests, aspen stands and shrub thickets. Their relative abundance in each of these vegetation types within the Hills remains to be determined. Generally it can be said that they are not found in grassland vegetation types.

The habitat of the northern long-tailed meadow vole is "alpine-like" meadows. Generally, it can be expected to inhabit meadow areas within the coniferous forest and coniferous/deciduous mixed forest vegetation types. In the remainder of the province this species is confined to the mountain zone.

The final member of this family, the great plains muskrat, has significantly different habitat requirements. The muskrat inhabits lakes, streams, sloughs and reservoirs throughout all major biomes in Southern Alberta. In the Cypress Hills muskrats are most commonly sighted in cattail marsh regions. Cattail is the material commonly used in the construction of houses. Five muskrat houses were observed on the southern shore of Elkwater, two at Spruce Coulee Reservoir and three at Reesor Reservoir. All were located in cattail marshes. During field work in 1973, no muskrat houses were observed in streams within the study area. Muskrats feed primarily on emergent and submergent plants such as rushes and pond weeds.

Jumping Mice

The Saskatchewan jumping mouse is the only member of this family which occurs in the study area. It is distributed throughout the

prairie and aspen parkland biomes. In the Cypress Hills this species has been trapped in mixed aspen/spruce forest. It also probably occurs in aspen and white spruce forests.

Porcupines

The sub-species known as the California porcupine occurs in the Cypress Hills area. Within the park, they are thought to be distributed in forest and shrub vegetation types. No porcupine or signs of porcupine activity have been observed during field activities in 1973.

Coyotes and Foxes

Two species of canid occur in the study area. The coyote is commonly and widely distributed throughout Alberta. Coyotes are also common in the park. During an aerial survey in 1972, 14 were sighted. Coyotes are generally thought to prefer grassland vegetation types. However, open woodlands and dense woodlands with open meadows are undoubtedly used. At present, the coyote appears to be the only common "large" predator within the park. Coyotes feed primarily on rodents, birds, reptiles, insects, and carrion. They have also been observed to take adult white-tailed deer when cover and snow conditions are in their favour. In addition, they undoubtedly feed to some extent on the young of all five of the ungulate species inhabitating the Hills.

The status of the red fox in the Cypress Hills is unknown. Previous writers have indicated that they are scarce. In Alberta generally their distribution is confined to the aspen parkland and boreal forest biomes. The distribution within the Hills is probably closely associated with woodland areas or dense forests punctuated by open meadows.

Other than the occassional sighting, the kit fox is no longer found in Alberta. Although the Cypress Hills lie within its former range, it is doubtful that this species was ever common in the Hills since it is primarily an inhabitant of the short-grass prairie biome.

Raccoon

The Upper Mississippi Valley raccoon has been recorded sporadically throughout the southern half of the province. It's status in the Cypress Hills is unknown. In November, 1959, one was shot at Fox, Alberta in Cypress Hills. This species is generally to be found in either deciduous or coniferous woods, usually along stream courses.

Weasels, Mink, Badger, Skunk

Six members of this family have been recorded as occurring in the vicinity of the Cypress Hills. The little rocky mountain weasel and the larger prairie long-tailed weasel both occur in the study area. The distribution of the little rocky mountain weasel is confined mainly to the forested areas of the province, whereas that of the long-tailed weasel closely follows the grasslands. Overlap occurs in the aspen parkland. In the Cypress Hills, the little rocky mountain weasel is likely to be found in spruce, aspen, lodgepole and willow vegetation types. The long-tailed weasel is most likely to occur in grassland areas, showing a preference for short grass regions.

There have been unsubstantiated reports that the least weasel occurs in the Cypress Hills region. This species is found throughout the province but is primarily a woodland inhabitant.

A small population of Hudson Bay mink are said to occur in the Cypress Hills. In the rest of Alberta, the distribution of this species is generally confined to the mountain and boreal forest zones. This species has "semi-aquatic" habits and is most likely to be found along lake and stream edges within coniferous or mixed coniferous/deciduous forest.

The Cypress Hills lie within the former range of the black-footed ferret. However, this species like the kit fox is primarily an inhabitant of short-grass prairie regions.

The range of the American badger in Alberta is confined to prairie and parkland regions. Some evidence of badger activity was noted in the Reesor Hills area. Their general abundance in the grassland regions of the Cypress Hills is not known.

The Northern Plains skunk is found throughout Alberta. The numbers of this species in the Cypress Hills are said to be greater than the prairie regions generally. In the Hills, they probably range through most vegetation types. This species is primarily carnivorous feeding mainly on insects, amphibians and mice.

Cats

Two members of this family occur in the Cypress Hills. These are the Canada lynx and the pallid-barred bobcat. Both are woodland species. In the Hills, the southern extent of the lynx range overlaps the more northern extent of the bobcat's range. At the present time, neither species appears to be common in the Hills and no information on recent sightings is available. The two species have decidedly different habitat preferences. Lynx are primarily a forest inhabitant and are most likely to be found in spruce and mixed spruce/aspen vegetation types. The bobcat shows a preference for dryer "brushy" areas and rocky hillsides. In the 1920's, ranchers reported killing bobcats in the brushy draws around the slopes of the Cypress Hills plateau.

As was mentioned previously, the lynx prey primarily on varying hare and their population exhibits a ten-year cycle fluctuation.

There have also been various sightings of cougars in the area. These, however, are thought to be "accidental" wanderers.

Deer

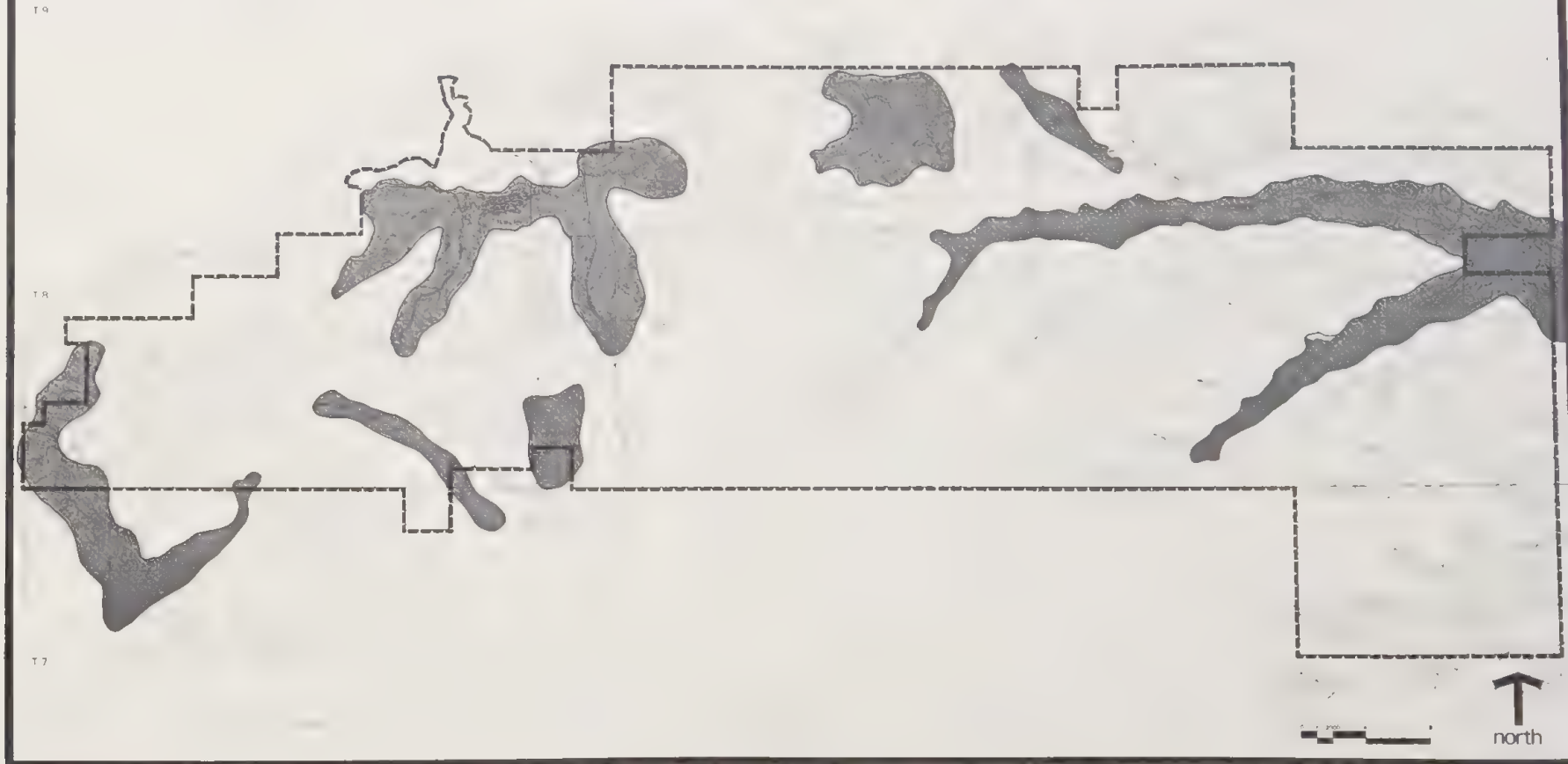
Moose

Four moose were introduced into Cypress Hills Provincial Park in 1956. They are thought not be native to the Park. However, there are some reports to the contrary. It is possible that they were eliminated along with many of the other large mammals in the late 1800's.

The population in 1967, was estimated at 119. This estimate was hypothesized on the basis of a presumed natural increase rate; excluded from these calculations were mortality factors. On the basis of the estimated population, the amount of available habitat and the condition of the browse, culling of the moose population was recommended. In February, 1970, 25 moose were shot. The population prior to the culling operation was estimated at between 80 and 120 animals. One hundred and eighteen moose were recorded in the 1972 aerial survey. Thirty-two of these were bulls, 60 cows, 23 calves, and three unidentified. The ratio of cows per hundred calves changed from 53 in 1971, to 39 in 1972, indicating a possible decrease in fecundity.

Map 11 indicates the winter distribution of moose. As the map shows, the range generally follows the creek valley bottoms. This distribution pattern, supplied by the Department of Fish and Wildlife, Lethbridge, is based partly on field observation and partly on known habitat requirements. Accurate information on seasonal changes in distribution was not available. Density undoubtedly changes from season to season. Moose studies on willow range in Montana and Wyoming indicate that at certain times of the year, moose densities of from 25 to 50 per square mile occurred.

During the culling operation in 1970, rumen samples were analyzed. For the month of November, it was found that Saskatoon berry made



LEGEND

WILDLIFE

Winter Distribution of Moose

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CYPRESS HILLS PROVINCIAL PARK

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up 50 per cent of the moose's diet. Other browse species, in order of abundance, were aspen poplar, choke cherry, and pin cherry. Field work carried out in the spring of 1973, indicated moose were feeding extensively and intensively on young aspen on the plateau regions. They were also observed feeding on willow at the perimeter of Elkwater Lake and in the Graburn and Battle Creek valley bottoms. Different browse species are undoubtedly used at different times of the year, according to availability and palatability. Because of bioenergetic considerations, when mobility is restricted by snow, browsing is less selective and and more intensive. Dickinson observed that preferred browse species were willow, aspen, poplar, pin cherry, Saskatoon berry, and red osier dogwood. Other studies of moose in Western North America, indicate considerable variation in winter browse. In most studies, willow is preferred. In the Gallitan moose study, service berry, choke cherry, and dogwood were preferred. In all studies, grasses and forbes received very little use at any time of the year.

In 1967, Dickinson established seven browse sample lines to determine the impact of moose on vegetation. Two of the lines were thought to be used exclusively by moose, while five were thought to be used also by deer. In 1967, leader use of browse species was averaged for all seven sample lines, and it was determined that the past winter's use was 66.5 per cent. A re-survey of these browse lines in 1968, plus the sampling of 11 non-permanent browse lines, indicated an average browse use of 65.0 per cent. Five of the seven permanent browse lines were re-sampled in 1969 (whether these browse lines included or excluded the two "exclusively" moose habitat areas is not stated). The leader use at this time ranged from between 48.6 per cent to 88.8 per cent. The average total leader use was 76.9 per cent. The allowable amount of browse use is said to range between 50 per cent and 70 per cent, depending on plant vigour and the severity of winter weather conditions.

A major objective of the 1970 culling operation was to assess the physical condition of the moose. Prior to that time, the moose were thought to be in poor condition as a result of a deteriorating habitat. Conversely, however, moose were found to be in good condition and were free from any major diseases. In addition, all ten mature females collected were found to be pregnant, one with twins.

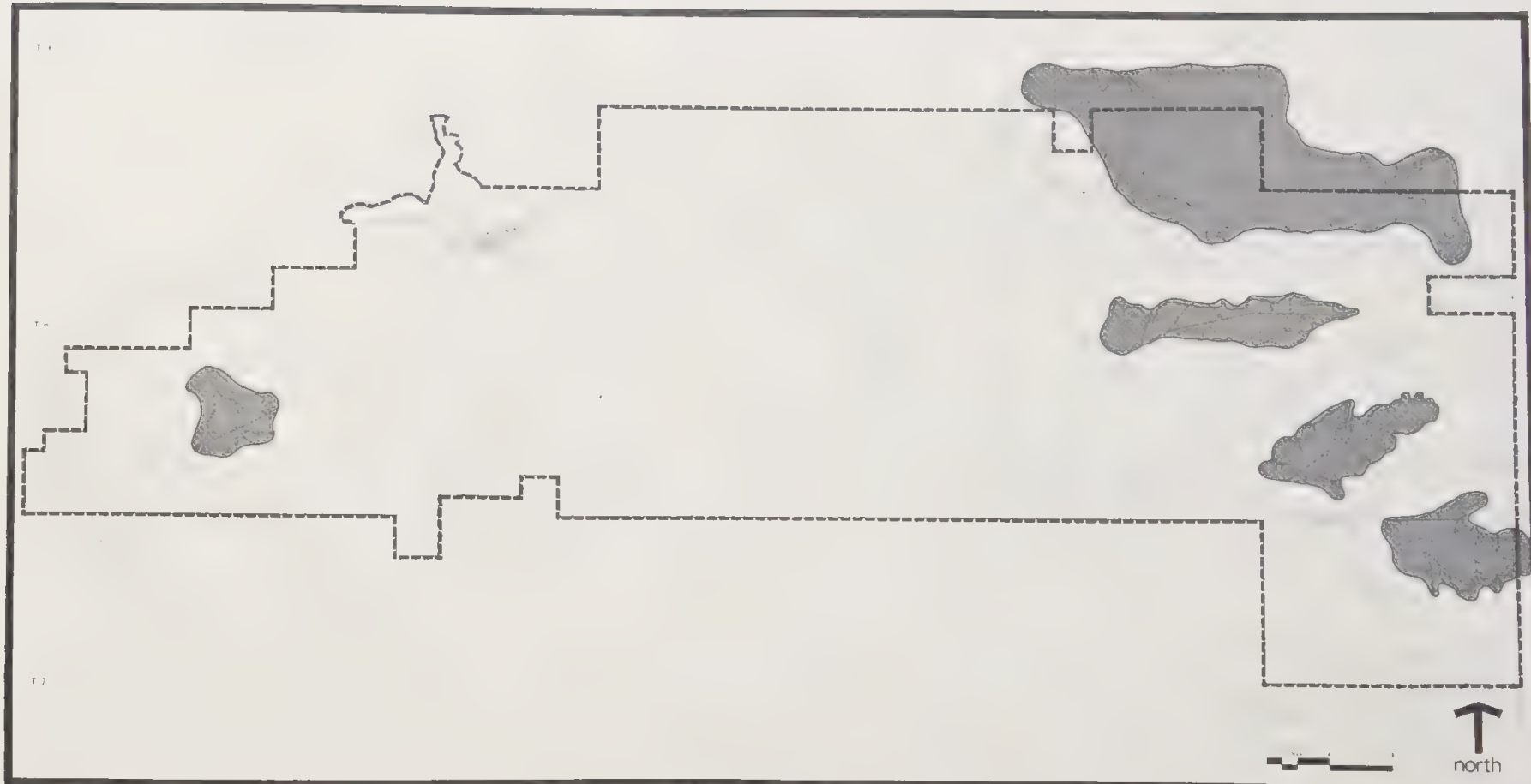
Elk

Elk were originally eliminated from the Cypress Hills area of Alberta in the 1890's. They were subsequently re-introduced in 1938. The Saskatchewan government at the request of a group of Saskatchewan ranchers, acquired a carload of elk from Wainwright, Alberta. Three groups of elk were released on the properties of three ranchers. Shortly thereafter one group re-populated the West Block of the Cypress Hills on the Saskatchewan side. Elk were first noted on the Alberta side of the Hills in the mid-1940's.

The number of elk in the West Block was estimated at between 250 and 300 in 1956. By 1966, this had apparently dropped to 150 head. The number of elk wintering in Alberta in 1966-67, was estimated at between 120 and 150. There is no certain data on population trends prior to this point.

No information on summer population levels was available. Records of number of elk sighted from 1966 to the present are: 100-125 September, 1966, approximately 100 December, 1966, 72 March, 1967, 48 May, 1967, 221 December, 1972. If the 1966 and 1967 figures are accurate, it appears that the elk population has increased nearly two-fold over the past five years. It is, of course, possible that some of these animals emigrated from the West Block on the Saskatchewan side. During the 1972 aerial survey, 23 bulls and 198 cows and calves were observed.

Map 12 indicates the present observed winter distribution of elk. Major wintering areas are Police Point and the Reesor Hills. In the 1972 aerial surveys, 80 elk were sighted on the plateau north of Reesor Lake and 139 were sighted on the Police Point Plateau.



LEGEND

WILDLIFE

Winter Distribution of Elk

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Elk are also known to winter in the vicinity of Nine Mile Creek and a small area in the extreme west end of the park. In the summer, elk are distributed more or less evenly throughout the forested areas of the park. The only portions of the park which do not appear to be used by elk at any time of the year, are the grassland plateau areas which are remote from cover vegetation.

The winter range of elk overlaps the park boundary in the Reesor Hills area. At times, elk also leave the park in the Medicine Lodge Coulee area.

Sheltered south-facing slopes which have less snow accumulation, are preferred elk wintering areas, (Photo 11). Good cover vegetation near to these exposed feeding areas is also necessary for both shelter and hiding purposes.

Observations by Dickinson indicate that grasses are the preferred food of the Cypress Hills elk. However, no rumen analysis information was available to substantiate this. A study of elk in Riding Mountain National Park indicated the following food habits for elk.

Summer	-	grasses and sedges 22% forbs 26% browse 52%
Autumn	-	grasses and sedges 37% forbs 8% browse 55%
Winter	-	grasses and sedges 31% forbs 7% browse 62%
Spring	-	grasses and sedges 54% forbs 9% browse 37%

From these percentages, it can be seen that browse was the most significant food source for elk. Only in the spring did grasses constitute a greater percentage of the diet than browse.

A study of elk in Montana indicated some variation in percentages from year to year. Unlike the Riding Mountain situation, grasses were used extensively in all but the summer season, when the use of forbs increases substantially. Browse use was moderate throughout the year, increasing somewhat during the winter months.

Mule Deer

Both mule deer and white-tailed deer have received considerably less research attention than elk or moose. The most detailed work on the Cypress Hills mule deer has been done by August Kramer. His studies indicate that the mule deer population of Cypress Hills Park declined considerably from 1968 to 1969. For example, during the month of November 1968, 947 sightings of mule deer were made in 376 observation routes, compared to only 278 mule deer sightings made on 293 observation routes in 1969. During aerial surveys carried out in early December, 1972, 119 mule deer were counted. Twenty-four bucks were sighted and 95 does and fawns. Ground surveys to determine more closely the number of mule deer within the park were not available.

It is speculated that snow conditions, rather than snow depth, were responsible for the high mortality in mule deer during the winter of 1969. (The critical snow depth for mule deer is 18 inches. Snow depth during October to November, 1969, was well below this level.) A combination of high winds and temperatures above freezing, led to the formation of crusted or hard-packed areas which impeded movement and feeding, and consequently resulted in an abnormally high mortality rate. Therefore, it might appear that present mule deer populations are below the carrying capacity of the habitat.

Map 13 indicates the present distribution of mule deer. As with elk and white-tailed deer areas of the winter range occur outside the park boundary, particularly in the area of the Reesor Hills. Generally, however, mule deer winter range closely follows the wooded areas which, for the most part, are within the park boundary.

No information was available on the specific food habits of the mule deer of Cypress Hills. Food studies of mule deer in the Waterton region and in Montana, indicate that mule deer feed primarily on forbs during the summer and fall, and switch to browse only when forbs become covered by snow. The winter food supply consists almost entirely of shrubs. During the spring, browse still constitutes the primary food source, however, almost as high a percentage of forbs are eaten. Only during the spring period are grasses and grass-like plants fed on to any degree.

White-Tailed Deer

Unlike mule deer, the white-tailed deer population in the Cypress Hills appears to have remained unchanged in recent years. Kramer observed 436 white-tailed deer on 376 successful observation routes in 1968, and 346 white-tails on 293 successful observation routes in 1969. The number of white-tailed deer using the park in the summer is thought to be much greater than the winter population. (During an aerial survey conducted in the first week of December, 1972, 116 white-tails were observed; 21 of these were bucks and 95 does and fawns.) When snow conditions become adverse (the critical snow depth for white-tailed deer is about 16 inches), most white-tails leave the park to spend the winter on the open prairie. During January, the majority of the Cypress Hills white-tails are wintering south of the park, usually in small groups. At this time, they usually feed and bed down on Agropyron-Stipa association with willow and rose patches.

Antelope

Prong-horned antelope are fairly common north and south of the park. Within the park, they are found mainly on the plateau near the southern boundary. Snow conditions probably prohibit their use of this during the winter time. From 15 to 20 antelope are said to occur in the park at any one time during the summer months.

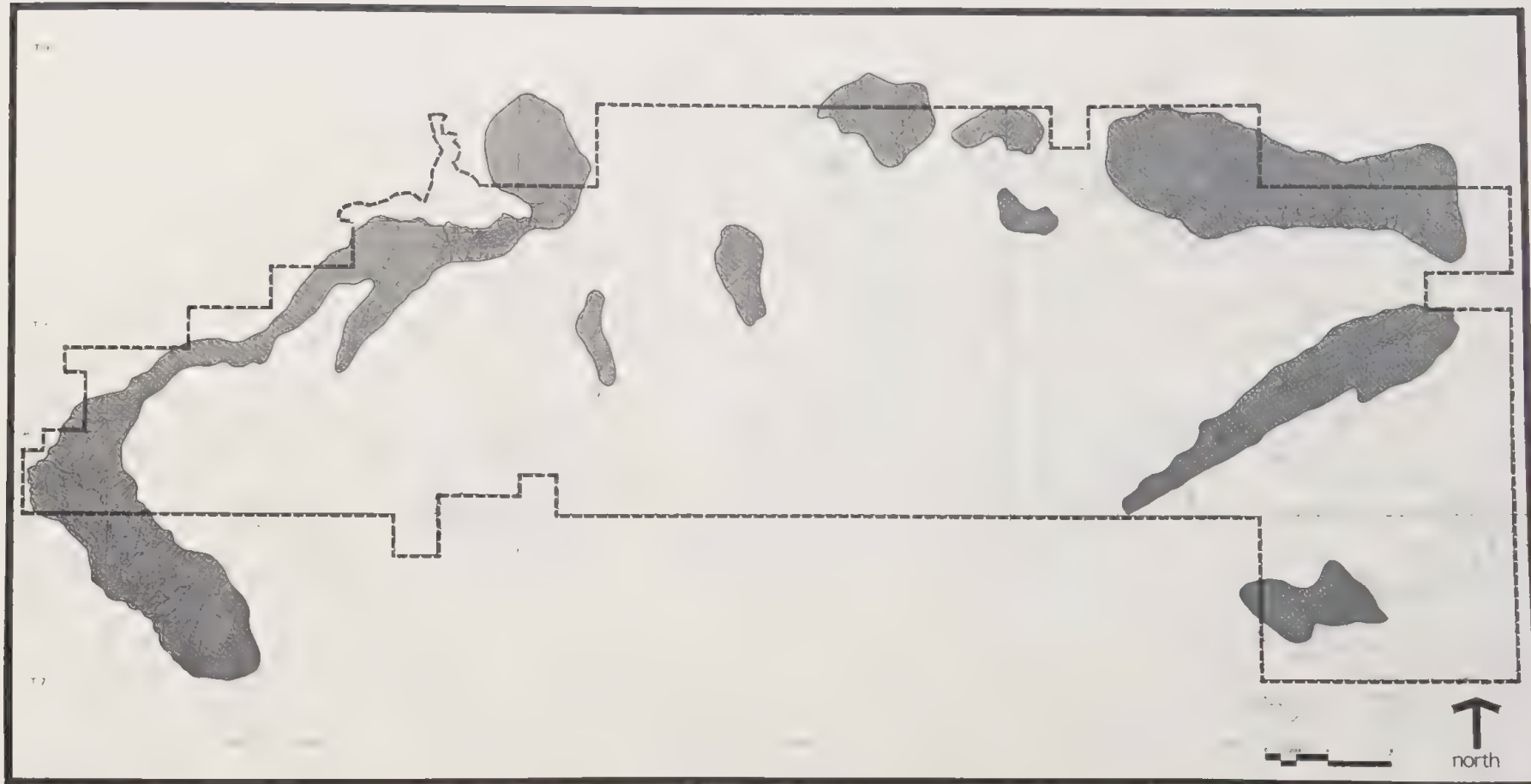
The principle food of antelope studied in the Newell area was forbs in the spring and summer (57 per cent and 62 per cent respectively), mainly browse in the fall (50 per cent), and evenly divided between browse and forbs in the winter (43 per cent and 47 per cent respectively). Grasses were only used during the spring (25 per cent). By far, the most commonly used browse species was Artemesia cana (sage brush). The most frequently used forb was Artemesia frigida (pasture sage wort).

BIRDS

Unlike mammals, the majority of bird species in the study area vacate the Cypress Hills during the winter. Therefore, this discussion of the birds will be concerned primarily with those species which breed or feed extensively in the area. Migrants generally are not dealt with unless, as is the case with some waterfowl species, they are known to "stage" or spend some time in the study area.

Because birds are more readily observed, information on this group is generally more extensive and detailed than for the mammal group.

As with the inventory section on mammals, this write-up of the birds of Cypress Hills of Alberta, is organized around family groups. The



LEGEND

WILDLIFE

Winter Distribution of Mule and White Tailed Deer

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CYPRESS HILLS PROVINCIAL PARK

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common names of the family will be referred to in the body of this text. A list of scientific names of families is included in Appendix 5 of this report.

Loons

The common loon has been observed on Elkwater Lake in early spring. Its distribution in the remainder of the province is generally confined to the mountain and boreal forest zones. It is not known whether this species previously nested here.

Grebes

Four species of grebe have been observed in the park. The red-necked grebe has been observed on Elkwater Lake early in the nesting season. Horned grebes, eared grebes, and pied-billed grebes have been observed on Elkwater Lake in the middle of the nesting season (1973). This area is thought to be out of the normal range of pied-billed grebes, however, they were observed in the cattail marsh near the causeway on numerous occasions. A lone horned grebe was observed on Spruce Coulee Reservoir early in the nesting season in 1973, in the vicinity of a cattail marsh.

Cormorants

Small numbers of double-crested cormorants were observed on numerous occasions on Spruce Coulee Reservoir. They were also observed to feed less frequently on Elkwater Lake and Reesor Reservoir (1973). Cormorant nesting colonies are scattered throughout the province. They do not nest within the park.

Herons, Bitterns

Great blue herons are the only member of this family which have been recorded in the park. They do not nest in the park, but were frequently observed feeding in the cattail marsh regions of Reesor and Spruce Coulee Reservoirs. This species is found less commonly in the surrounding short grass prairie biome.

No American bitterns have been recorded to date in the Cypress Hills, although this area is within their geographic distribution.

Waterfowl

Nine species belonging to this family have been observed in Cypress Hills Alberta during the summer. The number of migrants which might use the water bodies for staging purposes is unknown. Four species of surface feeding ducks, the American widgeon, mallard, pintail, and blue-winged
of these species were observed on Elkwater Lake (1973). Mallards and widgeons have also been observed at Spruce Coulee and Reesor Reservoirs. Widgeons appear to be the most common dabbling duck in the park. Three pairs of widgeons (two pair with seven young each, and one pair with 12 young), were observed on Reesor Reservoir and one pair on Spruce Coulee Reservoir. Blue-winged teal were observed on Spruce Coulee Reservoir.

Four species of diving ducks are known to inhabit the park. These are the lesser scaup, the redhead, the common merganser and the white-winged scoter. The scaup is by far the most common member of this group, and is found on Elkwater, Spruce Coulee and Reesor Reservoirs. The white-winged scoter has been observed on Elkwater Lake in early spring. A pair of Canada geese nested at Spruce Coulee Reservoir in 1973, and were observed to have five young.

Prior to the construction of Reesor Reservoir in the early 1950's, trumpeter swans nested on what was then Twin Lakes. They are not thought to have occupied the study area since that time, although a small breeding population is present on the Saskatchewan side. It is not known whether the absence of this relatively rare species from the park is the result of the lack of appropriate habitat, or whether other factors such as disturbance are involved.

During the month of June, 1973, a general survey of available waterfowl habitat was made as part of an aquatic resources inventory. The primary factor investigated was nesting cover conditions. The majority of the shoreline area of Elkwater Lake, Reesor and Spruce Coulee Reservoir was found to be grasses and sedges. In very few areas does shrub growth extend to water's edge. The southern perimeter of Elkwater Lake contains some isolated but reasonably sized areas of rush and cattail marsh. The cattail marsh is most extensive in the area of the causeway. Spruce Coulee Reservoir contains some small areas of rush growth and two fairly extensive cattail marsh areas. Reesor Reservoir contains comparatively few areas of emergent vegetation. Several areas of isolated cattail marsh areas are present.

Blue-winged teal, widgeon and pintail nest primarily in grass cover types. The mallard will nest in a variety of cover types. The white-winged scoter nest preferentially in lightly wooded areas. The common merganser also generally nests in wooded areas. The lesser scaup nests in marsh/sedge or shrub cover types. The redhead nest primarily over water in cattail and rush cover types.

Hawks and Falcons

Eight members of this family have been recorded in the Cypress Hills area.

Three buteos, the red-tailed hawk, Swainson's hawk, and broad-winged hawk, are known to inhabit the area. Both Swainson's and red-tailed hawks are fairly common throughout southern Alberta. Generally, they hunt grassland areas and use woodlands only for nesting. Both of these species were sighted fairly regularly during field work carried out in 1973.

The much smaller broad-winged hawk appears less common in the Cypress Hills than the buteos previously mentioned. Its hunting habits are decidedly different. It spends less time soaring and is somewhat "accipiter-like" in its hunting habits, and therefore, may be more common than it appears. Preferred habitat for broad-winged hawks is mixed-aspen/spruce woodlands, interspersed with small meadows.

Three species of accipiter inhabit the forested areas of the Cypress Hills. These are, in order of size, the goshawk, Cooper's hawk, and sharp-shinned hawk. In Alberta, the goshawk and sharp-shinned hawk are primarily found in the mountain and boreal forest zones. The Cooper's hawk appears to be confined more to the foothills and mountain areas. It is difficult to estimate the relative abundance of these species in the park, since all are, by nature and necessity, rather secretive. All are primarily forest species and do not vary significantly in their habitat requirements. The marsh hawk is a grassland species. Although it does not appear to be common in the park, several young marsh hawks were observed flying over the plateau grasslands during 1973.

The only falcon known to breed in the Cypress Hills park area is the merlin. A number of merlin sightings have been made to date, during field work in 1973. Generally in southern Alberta merlins show a preference for prairie regions which contain sufficient tree growth for nesting purposes.

Grouse

Two species belonging to this family are found in the study area. The ruffed grouse, which was introduced to the Cypress Hills, is

found primarily in mixed aspen/spruce woods, but also in aspen woodlands.

The sharp-tailed grouse is mainly a grassland specie. The abundance of this specie is not known. A female with five young was observed on the plateau grassland during field work carried out in 1973.

Turkeys, Partridges

The wild turkey is the only member of this family which has been recorded in the park. It was introduced to the park in 1922. It occupies woodland/grassland edge areas and is thought to be more commonly associated with lodgepole pine areas than other woodland types. Sixteen wild turkeys were originally introduced. By 1965, the total number of turkeys in the Cypress Hills of Saskatchewan and Alberta was said to be over 200. The Cypress Hills is the only place in Alberta where the wild turkey occurs.

Rails and Coots

A single member of this family is known to occur in the Cypress Hills. The sora has been reported as a summer resident of the larger water bodies. An extensive bed of reeds or sedges is required for nesting.

The coot, although widely and commonly distributed throughout all of Alberta, has not been recorded as residing in the park.

Plovers

Only one member of this family, the killdeer, resides in the park. The killdeer is common throughout most of Alberta. They are found primarily along rocky stream edges and lakeside mud flats. Killdeer are also fairly common in the park.

A number of northern migrants belonging to this family, pass through the general area but none, as yet, have been recorded in the park.

Snipes, Curlews, Sandpipers

At least four members of this family are known to occur in Cypress Hills Provincial Park. These are the Wilson's snipe, long-billed curlew, upland plover and spotted sandpiper. The study area is within the breeding range of the willet and marbled godwit, however, their status in the study area is unclear. (These species are principle inhabitants of large prairie sloughs). In addition, a large number of migrants belonging to this family pass through the area. Detailed information on the use of the Cypress Hills water bodies by migrants, was not available.

The Wilson's snipe and spotted sandpiper are both found throughout Alberta and both inhabit aquatic environments. In the park, spotted sandpiper can be observed along rocky lakes and stream or pond edges. Wilson's snipes inhabit marshy areas and grassy regions beside lakes, ponds, and streams.

Upland plovers and long-billed curlews are principly upland species. The upland plover is distributed irregularly throughout all but the mountain regions of Alberta. The curlew is primarily in inhabitant of the prairie biome. In field work carried out in 1973, no curlews were sighted. Upland plover were commonly observed on plateau grasslands. They are thought to prefer native fescue grasslands. However, all sightings thus far made were in "over grazed" shrubby cinquefoil dominated grasslands.

Avocets

A single member of this family, the American avocet, is found in Alberta. The avocet is principly an inhabitant of prairie biomes. Although the Cypress Hills lie within its breeding range, its preferred habitat is the alkaline sloughs and lakes of the prairie. Therefore, it is unlikely to occur with any regularity in the Hills.

Phalaropes

The Wilson's phalarope is the only member of this family found in the park. Preferred habitat is muddy or grassy slough edge areas. Because of these habitat requirements, it is likely to be more common in the grassland biome surrounding the hills than in the hills themselves.

Pigeons, Doves

Two members of this family are to be found in the study area. These are the morning dove and the rock dove (domestic pigeon), which is an exotic species.

The morning dove is found throughout the grassland and parkland areas of the province. In the park, it can be heard fairly commonly. Preferred habitat is brushy areas near to meadow or grassland regions.

The domestic pigeon is found in the region of Elkwater townsite.

Cuckoos

The black-billed cuckoo is the only member of this family found in Alberta. This species inhabits the prairie regions of the province, but has not been observed in the Cypress Hills.

Owls

Five representatives of this family have been recorded in the study area. These are: the great horned owl, long-eared owl, short-eared owl, saw-whet owl, and the barn owl.

All of these, with the exception of the barn owl, are fairly common in other areas of Alberta. Great horned owls are likely to be found in any tall forest stands, but in the park, are said to be more common in balsam poplar woodland, particularly just west of the townsite. On two occasions in 1973, (summer), great horned owls were observed at dusk in the grassland on the northern boundary of the park. The short-eared owl, a ground nester, is said to occupy the grassland regions of the park. Populations occupying any particular area, vary considerably from year to year in the Province. No short-eared owls have, as yet, been sighted in the park in 1973.

The saw-whet owl occupies the aspen and balsam poplar regions of the park nesting in old woodpecker holes. It is said to be uncommon in the park. The only sighting of a barn owl to be made in Alberta was recorded in the Cypress Hills during 1971. Whether this species continues to occupy the study area is not known.

Goatsuckers

Two members of this family, the poor-will and the common nighthawk have been recorded in the study area. The nighthawk can readily be observed at dusk, flying over all woodland regions. They are scarce in the surrounding prairie regions. Small areas of gravel are the most frequently used nesting sites.

The Cypress Hills is the only place in Alberta where the poor-will has been recorded. These observations were made in 1945. The present status of this species is unknown.

Hummingbirds

The ruby-throated hummingbird is the lone member of this family found in the Cypress Hills. This species is distributed throughout much of Alberta, but most commonly in the aspen parkland. It is probably more common in the Cypress Hills than in the surrounding grassland region.

Kingfishers

A single member of this family, the belted kingfisher, is found throughout Alberta. In the Hills, it can be regularly observed around streams and larger standing water bodies. Nesting burrows are constructed in clay banks near water. Kingfishers have been observed at Elkwater Lake, Reesor Reservoir and Battle Creek.

Woodpeckers

Six members of this family are thought to occur in the study area. Two sub-species of flicker, the red-shafted and the yellow-shafted have been recorded nesting in the Cypress Hills. In Alberta, the yellow-shafted flicker is found in the boreal forest and the red-shafted flicker, in the mountain region. The relative abundance and distribution of these species in the park is not known. Although both the downyand hairy woodpecker are found in the park, the hairy woodpecker is said to be the more common of the two. The hairy woodpecker is more commonly found in mixed wood areas, whereas the downy is most frequently observed in poplar woods.

Although out of its recognized range, yellow-bellied sapsucker has been recorded nesting in the Cypress Hills. Mixed wood areas are preferred by this species.

Several reports are on record of red-headed woodpeckers occurring in the Cypress Hills. Definitive information on the present status of this species in the study area, was not available.

Flycatchers

The Cypress Hills lie within the breeding range of six members of this family. These are: The Eastern kingbird, Western kingbird, the Say's phoebe, Traill's flycatcher, the least flycatcher, and the dusky flycatcher.

Three of these, the Eastern kingbird, Western kingbird, and Say's phoebe, can be found in the prairie biome surrounding the Cypress Hills. The kingbirds nest in deciduous trees and shrub near open terrain, while the Say's phoebe nests in rocky crevices. The Eastern kingbird can be commonly observed on the plateau grassland areas of the park.

Within the province generally the Traill's flycatcher is found primarily in the aspen parkland/boreal forest region, the least flycatcher in all but the mountain regions, and the dusky flycatcher only in the mountain areas.

Both the Traill's and dusky flycatchers prefer willows and other shrubs to forested areas. The least flycatcher is found primarily in aspen/grassland edge areas. The relative abundance and distribution of these species within the park has not been well documented.

A number of other flycatcher species have been recorded as migrants in the Hills.

Larks

The horned lark is the single representative of this family in Alberta. It is principally a grassland and meadow species. It does not appear to be common in the Cypress Hills, but has been observed in the Reesor Hills area.

Swallows

The Cypress Hills lie within the breeding range of five members of this family. These are: the bank swallow, the rough-winged swallow, the barn swallow, and the cliff swallow. The violet-green swallow, normally a mountain species, has also been recently recorded nesting in the Hills.

Bank swallows and rough-winged swallows nest in holes in clay or sand banks. Bank swallows are common in the Reesor Lake vicinity.

With the exception of the tree swallow, all of these species are to be found near water in the surrounding grassland biomes.

Chickadees

A single member of this family, the black-capped chickadee, is found in the study area. This species is fairly common throughout Alberta. In the Park, it is most common in the mixed-woodlands, but is also found in other woodland types.

Nuthatches

The red-breasted nuthatch is the only member of this group to be recorded in Cypress Hills Park. It is found throughout Alberta, but is generally scarce in the prairie biomes. It is principly an inhabitant of woodlands. In the Park, it is most likely to be found in the more mature conifer stands.

Creepers

The only member of this family found in Alberta is the brown creeper. Generally, it is associated in the coniferous and mixed wood regions of the province. This species nests in the park, but is not found in the surrounding prairie regions.

Wrens

Two members of this family, the house wren and the rock wren, are known to nest in the park. The rock wren inhabits mainly dry rocky coulee areas and therefore is undoubtedly more common in the surrounding short grass prairie regions than in the moister hills. The house wren is found in all but the mountain regions of the province. Its preferred habitat is dense shrubbery.

The long-billed marsh wren has also recently been recorded in the Cypress Hills. Its preferred habitat is extensive areas of cattail marsh. A pair of long-billed marsh wrens were observed just east of the causeway, during field work carried out in 1973.

Mockingbirds, Thrashers

The catbird and the brown thrasher represent this family in the study area. Both species are found primarily in grassland and parkland regions of the province. Both occupy dense undergrowth or shrub vegetation types, and have been recorded nesting in the park, but are thought to be scarce. Catbirds typically inhabit upland shrub areas, such as thorn brush groves.

Thrushes

Four thrushes are known to occur in the Cypress Hills. These are the robin, the Swainson's thrush, the veery, and the mountain bluebird. All of these species have decidedly different requirements.

Bluebrids prefer open areas in association with woodlands. They can be observed fairly commonly on the plateau-grassland regions of the park. They are distributed throughout the remainder of the province with the exception of the more northerly areas.

The veery is generally found in the aspen parkland areas of the province. It typically inhabits deciduous woodlands with a dense understory of shrubs. This specie is scarce in the park.

The Swainson's thrush inhabits spruce and mixed wood vegetation types. It can be heard frequently in most areas of the park. In the remainder of the province, its distribution generally is confined to the mountain and boreal forest areas.

The robin is the other member of this family found in the park. It is distributed throughout the province. In the park, aside from household lawns, it is found mainly in meadow areas which are enclosed by either deciduous or coniferous forest.

Crows, Magpies, Jays

Two species belonging to this family are found commonly in the Cypress Hills. These are the common crow and the black-billed magpie. They are primarily associated with the deciduous woodland regions but forage widely through many habitat types. Both of these species appear common in the park.

Vireos

The red-eyed and warbling vireos both nest in the Cypress Hills. The red-eyed vireo is found throughout the province and is principally associated with aspen groves and open mixed wood forest regions. The warbling vireo is also found throughout the province. Also like the red-eyed vireo, this specie is primarily associated with aspen poplar woodlands. Both species are thought to be uncommon in the Cypress Hills.

Wood Warblers

Some discrepancies exist in the literature, but it is generally agreed that at least eight members of this family nest in the Cypress Hills. These are the orange-crowned warbler, the yellow warbler, Audubon's warbler, the ovenbird, MacGillivray's warbler, yellowthroat, yellow-breasted chat, black and white warbler, and American redstart. The yellow-rumped warbler and MacGillivray's warblers are found principally in the mountain regions of the province, the orange-crowned warbler and American redstart in the mountain and boreal forest regions, the yellow warbler and yellowthroat throughout the province, while the yellow-breasted chat is found only in the southeast portions of the province in the Milk, South Saskatchewan, and Red Deer River Valleys.

Five of the eight species are associated mainly with shrub habitat types. The orange-crowned warbler, MacGillivray's warbler, yellowthroat, and American redstart are generally found in willow, alder, and birch vegetation types, which occur principally around lakes and by streams. The yellow-breasted chat is associated more with upland shrubs such as hawthorn, buffalo berry and rose bush.

Yellow warblers are associated with brushy coulee regions and aspen groves. They do not appear common in the park.

The yellow rumped warbler is scarce in the park and generally is associated with spruce and mixed wood regions. In the province it is mainly found in the mountain areas.

The ovenbird is distributed throughout the boreal forest areas of the province. It is primarily found in mixed woodland or open deciduous forest areas which have sparce shrub understories.

The black and white warbler is also said to nest uncommonly in the Cypress Hills. This species is generally confined to the boreal forest regions of the province and is associated with mixed-wood forests. In the park, it has been observed in tall willow habitat types.

Meadow larks, Blackbirds, Orioles

Eight species belonging to this family have been recorded in they Cypress Hills of Alberta. These are: the bobolink, Western meadowlark, yellow-headed blackbird, red-winged blackbird, Baltimore oriole, Brewer's blackbird, common grackle, and brown-headed cowbird.

The yellow-headed and red-winged blackbirds are primarily associated with cattail marsh areas. Red-winged blackbirds are found in the cattail marsh regions of Elkwater Lake and Spruce Coulee and Reesor Reservoirs. Yellow-headed blackbirds appear to be limited to more extensive cattail marsh regions of the southern perimeter of Elkwater Lake. Both of these species are found throughout most of the province with the exception of the mountain zones.

The meadowlark, brown-headed cowbird, and bobolink are primarily grassland species. The former two will occupy all grassland types. The meadowlark is one of the more common birds on the plateau grasslands of the Cypress Hills, and can frequently be observed perched on shrubby cinquefoil. The bobolink is a rare species throughout its range in the province. During 1972, a colony were observed nesting in the wet meadow east of the Elkwater causeway.

The Baltimore oriole is found mainly in the prairie and parkland areas of the province. Its primary habitat is open poplar woodlands. The status of this specie in the park is not known. The Brewer's blackbird has a similar distribution in the province. The preferred habitat of the specie is low dense upland shrub areas. It appears to be fairly common in the park.

The common grackle occupies all but the mountain areas of the province. It inhabits a wide variety of habitats, but generally is not found in woodlands.

Sparrows

There is some discrepancy in the literature as to the number of species belonging to this family which occur in the park. There is general agreement that 14 species are resident nesters. These are: the pine siskin, American goldfinch, red crossbill, rufous-sided towhee, lark bunting, vespers sparrow, savannah sparrow, Baird's sparrow, Lark sparrow, Oregon junco, chipping sparrow, clay-coloured sparrow, white-crowned sparrow, song sparrow, McCown's longspur, and chestnut-collared longspur.

Seven of these species are primarily grassland inhabitants. These are: lark bunting, savannah sparrow, Baird's sparrow, vespers sparrow, lark sparrow, McCown's longspur, and chestnut-collared longspur. The first and the latter three are recorded as being scarce in the area. This is not surprising since all are primarily inhabitants of the short-grass prairie, although they may also utilize overgrazed tall and mid-grass areas.

Both the savannah and vespers sparrows inhabit long and short grass prairie regions and occupy both overgrazed and lightly grazed sites. These two species nest fairly commonly in the park. The final member of this grassland group, the Baird's sparrow, is mainly an inhabitant of the tall and mid-grass regions. As a consequence, it is more readily found in under-grazed areas.

The distribution of the pine siskin, red-crossbill, Oregon junco, and white-crowned sparrow, closely approximates the distribution of conifers. Pine siskins and red-crossbill are found mainly in spruce and pine forests, with dense mixed-wood margins. The pine siskin and red-crossbill are found throughout the mountain and boreal forest zones, while the Oregon junco and white-crowned sparrow are confined to mountain areas.

The American goldfinch is distributed throughout the province in all but mountain regions. It can be observed fairly commonly in the park and is associated primarily with aspen stands, with a shrub understory.

The rufous-sided towhee is confined to the prairie regions of the province. In general, preferred habitat is dense brush areas (Saskatoon berry, willow). This specie is thought to be scarce in the park.

The song sparrow inhabits open shrub areas or dense forest margins, and is distributed throughout the province. It is also a scarce resident of the park.

Isolated observations of Indigo and lazuli buntings, Brewer's sparrow and black-headed grosbeak have been made in the general vicinity of the study area. Their status in the park is unknown.

Observations of the white-winged crossbill, evening grosbeak, purple finch, and grasshopper sparrow have been made by provincial government personnel. The latter was recorded nesting in the wet meadow east of the Elkwater causeway. A number of grasshopper sparrows with young, were observed in the same area during field work carried out in 1973.

AMPHIBIANS AND REPTILES

In South Eastern Alberta generally 12 species belonging to these two groups are said to occur. Some of these, however, are associated with the arid short grass prairie biome. These are the short horned lizard (horned toad), the hog-nosed snake and the rattlesnake. Others thought to occur in this region of the province are: two species of garter snake, the red-sided and Western Plains garter snakes, the bullsnake, the painted turtle the common snapping turtle, the blotched tiger salamander, the plains spade foot toad, the great plains toad, the boreal chorus frog and the leopard frog.

The Western Plains garter snake, the bullsnake, the great plains toad, the boreal chorus frog and the leopard frog are known to inhabit the Cypress Hills. The Western Plains garter snake and bullsnake inhabit grassland and brushy coulee regions, while the great plains toad, boreal chorus frog and leopard frog are found in areas associated with open water.

Information on the status of the remaining members of this group could not be obtained.

UNIQUE WILDLIFE HABITATS

Traditionally wildlife management and planning for wildlife has focused on large mammals and waterfowl. This emphasis results from the "sport" bias as well as from the fact that these two groups are readily observable (and thus readily cognizable from a management point-of-view). In a park context, however a broader view is appropriate and an attempt should be made to enlarge the planning focus to include significant species representative of the fauna of the Park.

Because these other wildlife species are less readily observed, they must be mapped according to known habitat requirements rather than observed distribution. In addition, since it is impractical to map the probable distribution of every wildlife species in the park, an approach to select certain significant species is desirable. To accomplish this a representative grouping of species was made, which included: (1) birds: raptors, terrestrial species, and aquatic species; and (2) mammals: ungulates, small mammals, and carnivores. From each group the most unique or "valuable" specie was selected as discussed below. Then this specie's habitat was mapped on the basis of known habitat requirements using inventory maps such as vegetation and surface water. The result provides a planning focus sympathetic to the overall faunal context of the Park.

The primary criteria used to determine which specie was selected from each of these groups was rarity. Species which are rare provincially were considered more valuable than common species. Species which are found in the Cypress Hills but not in the short-grass prairie biome surrounding the Hills were shown preferrence. Further species which were found in rare or limited areas within the Hills were considered more valuable.

Birds

The birds of the Cypress Hills are divided into three categories on the basis of food habits. The groups are: raptors, terrestrial insectivores and/or gramnivores (seed eaters), and species whose feeding behavior is oriented towards aquatic environments.

From these groups the following species were selected: the broad-winged hawk, MacGillivray's warbler, and pied-billed grebe; they were selected for the following reasons:

Broad-winged Hawk

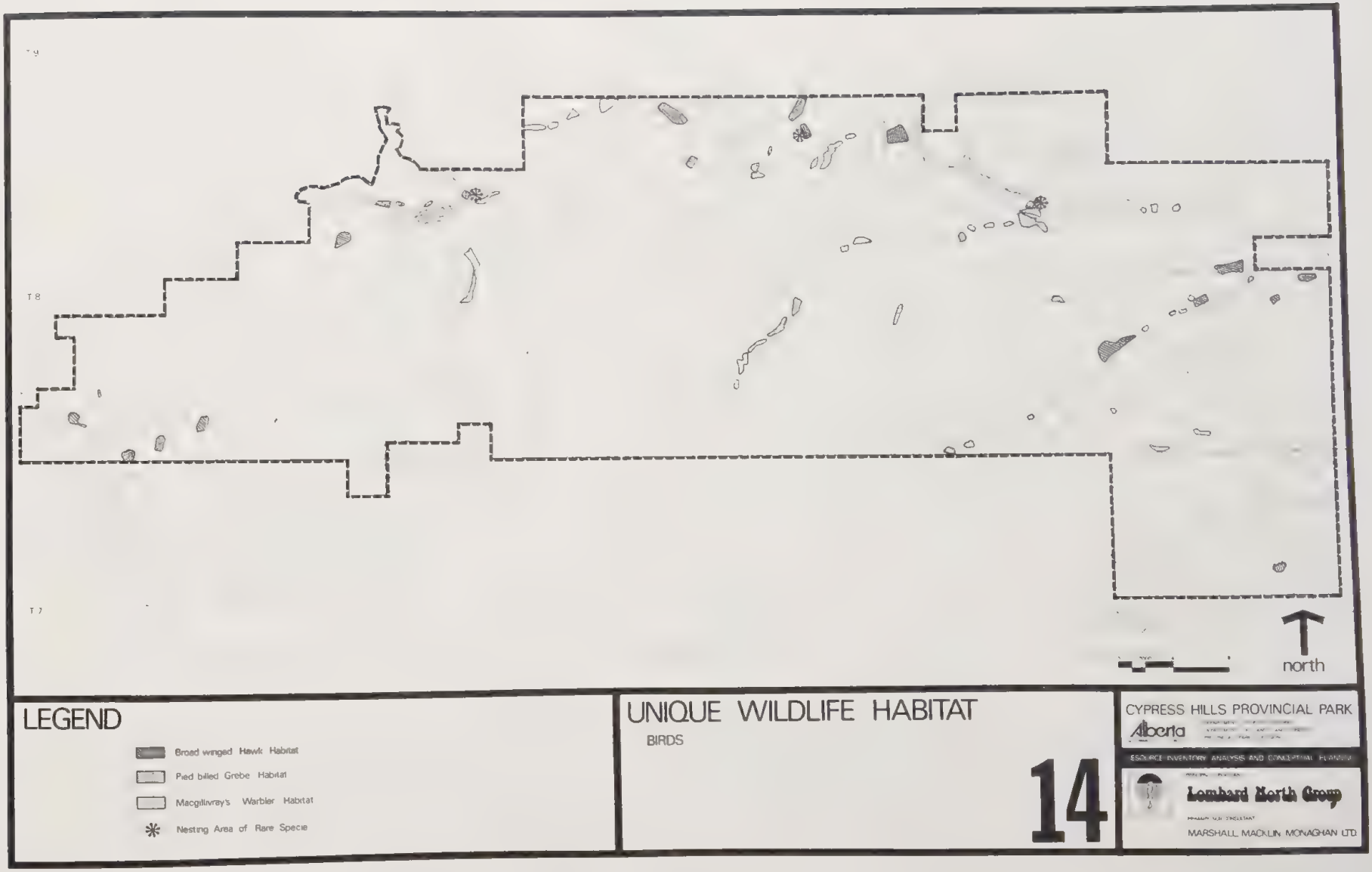
This species is normally found in the mixed-wood areas of the province; it is not found in the grassland regions. Provincially it is classified as a scarce summer resident and is not listed as occurring in the Cypress Hills. It has "fairly" specific habitat requirements, (Photo 12).

MacGillivray's Warbler

The Cypress Hills represent the eastern most extreme of this specie's range in Canada. It is normally a mountain specie and not found in the surrounding short-grass prairie biome. It also has specific habitat requirements, (Photo 13).

Pied-billed Grebe

The pied-billed grebe is a scarce summer resident in the boreal forest regions of the province. It is not found in the short-grass prairie regions surrounding the Park. It has very specific habitat requirements, (Photo 14).



LEGEND

- Broad winged Hawk Habitat
- Pied billed Grebe Habitat
- Macgillivray's Warbler Habitat
- Nesting Area of Rare Specie

UNIQUE WILDLIFE HABITAT

BIRDS

14

CYPRESS HILLS PROVINCIAL PARK

Alberta

RESOURCE INVENTORY ANALYSIS AND CONCEPTUAL PLANNING

Lombard North Group

MARSHALL MACKLIN MONAGHAN LTD

The "best" broad-winged hawk habitat was determined to be meadows partially enclosed by mixed-forest zones. The "best" MacGillivray's warbler habitat was thought to be willow/currant/cow parsnip and willow/sedge areas. Cattail marshes associated with open water were determined to represent the "best" pied-billed grebe habitat.

Map 14 indicates the distribution of the habitats occupied by these species. These areas represent the best potential habitats and all habitats of this type may not necessarily support these species. (i.e. some habitats may be disturbed by human activity or not used because of lows in the populations cycle.) All of these species have been observed in these types of habitat during field work carried out in 1973.

Mammals

The observability of large ungulates means that their winter range distributions are well known. Therefore, ungulates in general were considered rather than selecting a particular specie.

The remaining mammal species are divided into small mammals and carnivores. (Carnivores include bats, coyotes, and foxes, racoon, the weasel family and cats; the remainder are all classified as small mammals.) From the small mammal group the Missouri River beaver was selected and the mink was selected from the carnivore group. These two species were selected for the following reasons:

The Missouri River beaver was chosen on the basis that it is uncommon in the surrounding prairie biome and has readily identifiable and somewhat specific habitat requirements. Map 15 indicates the "best" beaver habitat which is in areas of poplar (aspen or balsam) forest alongside lakes or streams which have a "reasonable" depth of water. Beaver activity was observed in the majority of the areas indicated during field work in 1973.

The mink was selected as the most "valuable" representative specie of the carnivore group. It was chosen because it is normally a mountain species and is not found in the grasslands surround the Park; it also has specific habitat requirements. Map 15 also indicates the "best" mink habitat which consists of areas of spruce forest alongside lakes or streams; such as fairly limited in the Park. No mink were observed during field work in 1973.

FISHERIES AND THE AQUATIC HABITAT

Important sport fisheries in the Park presently exist only in the lakes (artificial and natural); the streams are not suitable for game fishes. Many of the species native to these lakes (stickleback, burbot, lake club, dace and suckers) are course fish. Native game species, on the other hand, were originally present in Elkwater Lake only.

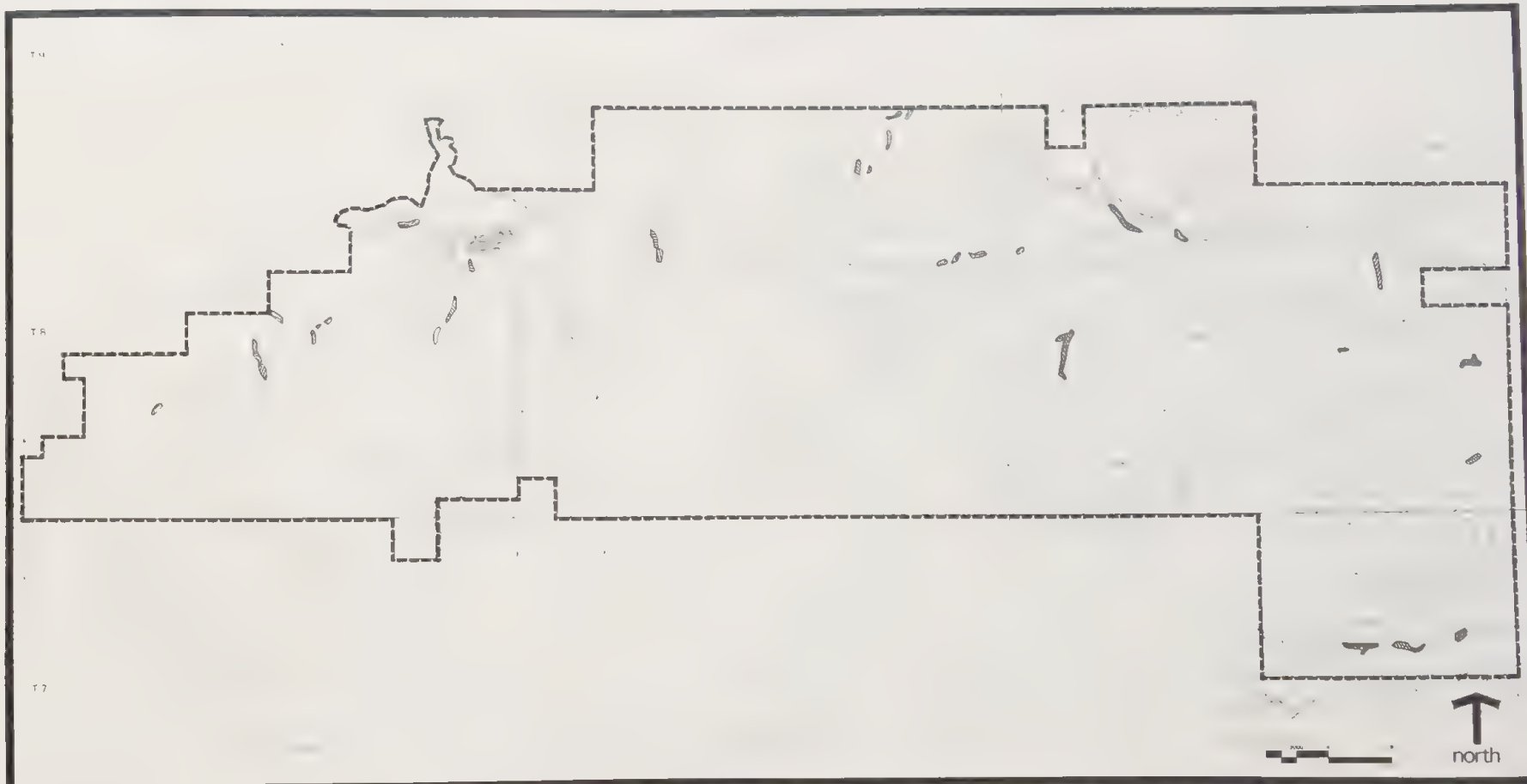
Rainbow trout have been planted in Battle Creek, Graburn Creek, and Reesor Lake; eastern brook trout have been introduced into Spruce Coulee Reservoir. A planting of yellow walleye and kokanee was made into Elkwater Lake, but proved unsucessful.

Standing Water

Elkwater Lake

Elkwater Lake has been consistently utilized for summer angling, and fishing pressure has been relatively high.

Pike and perch are taken regularly; the lake may in fact be a significant perch spawning ground. Power boating is currently authorized on Elkwater Lake.



LEGEND

Beaver Habitat

Mink Habitat

UNIQUE WILDLIFE HABITAT

MAMMALS

15

CYPRESS HILLS PROVINCIAL PARK

Alberta

RESOURCE INVENTORY ANALYSIS AND CONCEPT PLAN

Lombard North Group

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Reesor Reservoir

Reesor has been used for summer angling, in particular for rainbow trout. It has been suggested that Reesor be opened up for winter fishing. The value of this would seem questionable; the whole general area may be more suitable for other natural purposes as, for example, ungulate wintering.

The channel diversion of Battle Creek into Reesor Reservoir has had little apparent effect on the lake fishery, either through water quality or quantity. There can, however, be excessive seasonal "drawdown" on the reservoir, opening up the possiblity of winterkill of fishes by anoxia. This potential problem may be difficult to resolve due to the possession of local "water rights" (water-use licensing) by individuals in the area. (See Land Ownership Section).

The relatively new dock structure on the north side of the lake seems almost an anomaly in such a setting. One is inclined to question its value with respect to this type and size of lake, and to wonder if it is perhaps symbolic of an over-zealous commitment to sport fishing.

Power boating on Reesor is restricted to the use of electric motors.

Other Standing Waters

Spruce Coulee Reservoir has been extensively utilized for summer fishing, with heavy pressure on stocked species. Spruce Coulee Pond is probably subject to fish winterkill each year.

Running Waters

Battle Creek

Although the characteristics of this watercourse (before the Police Point Slump) were not especially unfavorable to game fish, the creek had not been a productive fishery. A great deal of effort has been expended in trying to transform it into a productive trout stream, without commensurate success. The advent of the slump has greatly aggravated the siltation problem in Battle Creek, causing further degradation of water quality, loss of spawning beds, and decimation of invertebrate fauna, especially of "clean-water" species. The siltation process, aided somewhat by beaver activity, has raised summer water temperatures near the point of lethality for trout. This situation of Battle Creek has been further aggravated by the effects of cattle grazing and consequent erosion of the stream banks, by the proliferation of roads and trails, and by channelling operations in connection with Reesor Lake campground. Some gradual improvement may be expected in the condition of Battle Creek, in the event that slump-reclamation is successful.

There is much beaver activity along the watercourse, as well as populations of coarse fishes (Table 13). It would be more advantageous to encourage these features, giving the watercourse over to natural aesthetics and to beaver-watching, rather than engage in a dubious and expensive attempt to transform it into a trout stream. In any event, the entire watershed should be protected from practices aggravating the erosion and siltation problem.

Other Streams

Many of the remaining Park streams are intermittents; the annual flow pattern of these streams features high runoff during spring

melt (and after heavy summer rains), diminishing either to a very small surface flow or to subterranean flow through unconsolidated materials. None have any significant potential as sport fisheries.

Table 13

Species of Fish Found in Battle Creek

Catostomus commersoni (Lacepede)	white sucker
Catostomus platyrhynchus (Cope)	northern mountain sucker
Chrosomus eos Cope	northern redbelly dace
Couesius plumbeus (Agassiz)	lake chub
Culaea inconstans (Kirtland)	brook stickleback
Etheostoma exile (Girard)	Iowa darter
Pimephales promelas rafinesque	longnose dace
Salmo gairdneri Richardson	rainbow trout
Semotilus margarita (Cope)	pearl dace

CULTURAL RESOURCES

THE NATURAL LANDSCAPE

THE PLAIN'S INDIAN CULTURE

THE FUR TRADE

SETTLEMENT

CONSERVATION

DECISIONS FOR TOMORROW

● ARCHAEOLOGY | HISTORY

Because of its distinctive physical character, the Cypress Hills is also biologically distinctive. Together, these factors create a setting offering a variety of park possibilities from the point of view of the physical and biological resources. However, in addition to its significance in terms of the natural landscape, it is also important in terms of the nation's cultural experience. Consequently, in developing the Park theme and the recreational emphasis, the land-use history of the Cypress Hills has an important place alongside the physical and biolgical criteria.

Throughout time, the resources of the Hills have been valued by the people of the surrounding region. From earliest man, who utilized the quartzite cobbles of the Cypress Hills Formation to fashion stone implements, to the present-day ranchers, who utilize the fescue grassland of the bench for grazing, man's relationship to the Hills has been one of exploitation. During the period when the dominant influence was the subsistence economy of the Indian, man's impact on the land was minor. With the introduction of the white man's profit-oriented commercial system, however, man's impact soon became significant. By 1879 the bison had been eliminated, the grizzly by sometime in the 1890's, the elk by 1909, the cougar by about 1914, and the wolf by about 1925; in addition, the Hills were reported to be largely denuded of forest cover by about 1900.

Countering this characteristic trend to overuse the "commons" significant conservation efforts designed to mitigate the abuse of the resources of the Hills. Consequently, an important theme embodying the Canadian Conservation Movement has manifested itself in the Cypress Hills and is symbolized by that landscape. The implications of this have a direct bearing on the management of the Cypress Hills Provincial Park; part of the area's identity is intimately and essentially linked to the evolving spirit of the Canadian Conservation Movement.

Indicated on Figure 6 is an overview of the major factors to be discussed in this section on land-use history in the Cypress Hills.

THE NATURAL LANDSCAPE

Only superficially is the present landscape of the Cypress Hills similar to the "natural" landscape of several centuries ago. The dark silhouette of the wooded slopes still commands the approaching travellers' attention and builds a sense of anticipation as it must have done for earlier travellers; if the camera of history were ignored one could readily imagine a timeless, windswept plateau little changed since antiquity. Historical account, however, reveals only too vividly that the environment has been altered dramatically and that we must turn to the journals of earlier travellers to animate what has been. Revealed is an isolated landscape within the trans-Missouri/Saskatchewan region where the wildlife and the Indians long resisted the winds of change - until the 1870's in fact - when they were finally displaced and overshadowed by other events of the Canadian Experience.

The landscape of the Cypress Hills region which the Indians and the first explorers beheld was a "buffalo" landscape; the hordes of bison numbered in the millions. In 1802 Peter Fidler recorded that along the South Saskatchewan River near its confluence with the Red Deer "the ground literally was black with them for a great distance." In 1805 Lewis and Clark described the plains along the Missouri River near the junction of the Yellowstone as being "animated by vast herds of buffalo, deer, elk and antelope." Other accounts remind us that the prairies rang with different sounds during buffalo days. In 1843 John Audubon wrote: "Thousands and thousands of buffalo...the roaring of these animals resembles the grunting of hogs, with a rolling sound from the throat...

Figure 6

Man and Landscape Change in the Cypress Hills

Period	Plains Culture (Pre-European - 1870's)	Fur Trade (1800 - 1870's)	Settlement (1870's - 1900's)	Conservation (1890's - Present)	Future
CRITICAL IMPACT		Wildlife 1870's	Timber/Water 1900's	Grazing 1970's	Recreation
CONSERVATION RESPONSE		HBC Regulations (Beaver) 1821	NWT Ordinance (Bison) 1877	Dominion Forest Res. I 1906 Dominion Forest Res. II 1911 Provincial Forest Res. 1931 Provincial Park 1951	Park Master Plan 1974
NATIONAL BACKDROP		Laissez Faire Attitudes	Transitional Period 1890's	Canadian Forestry Conv. 1906 Conservation Commission 1909	Recreation Explosion

the roaring could be heard for miles."

The myriad buffalo wallows located on the Cypress Hills plateau are a tangible but silent reminder that this landscape was once characterized by numerous bison, extensive trail systems, great quantities of dung, bones, organic debris, and a different set of sounds and smells.

Although this discussion focuses on the bison because of its dominant role in the ecosystem, it speaks symbolically for a vast associated fauna consisting of thousands to millions of antelope, elk, deer, grizzlies, wolves, cougar, beaver, hawks, eagles, pigeons, ducks, geese, etc. Today's tranquil vistas and peaceful surroundings belie the vigor of yesterday when the area was literally swarming with animal life of all kinds. It must have been a scene duplicated within our lifetime only in Africa.

Because bison grazed heavily, the image of the plains as a sea of mid-to-long grasses stretching to the horizon has been overdrawn. More likely the sensitive mid-to-long native grasses such as rough fesque and spear grass would have been damaged and reduced in frequency and, consequently, relatively resistant mid-and-short native grasses such as wheat grass, grama, and june grass would have been more common and extensive. Many early travellers on the plains spoke of a paucity of grass for their horses. In 1858 near Fort Carlton Palliser's expedition camped in an area "containing miserable herbage which had been cropped bare by the buffaloes...". This would have been the condition of much of the grassland of the Cypress Hills region.

The condition of the upper bench, however, presented a different aspect. In 1859 when camped on the bench within the Alberta Cypress Hills Palliser wrote: "We are now well supplied with wood, water, and grass, a rare combination of happy circumstances in our experience of this season's explorations." He also documents the presence of bison on the bench, "Descried buffalo; started off to run them; we killed a considerable number, and among them were several in very fair condition."

Because the descriptions of the surrounding, closely-cropped rangeland duplicate present conditions, Palliser's affirmative statements regarding the condition of the grass and the bison of the bench create the impression that the plateau was spared the intense overgrazing of the adjacent plains. This is reinforced by John Macoun's account in 1882: "The grasses of the plateau were of the real pasturage species and produced an abundance of leaves and were so tall that for miles at a time we had great difficulty in forcing our way through them. As we proceeded westward over the plateau, it becomes more elevated and other species began to take prominence, notably Lupinus argenteus (blue lupines) and Potentilla fruticosa (shrubby cinquefoil), and covered miles of country to the exclusion of other species and...grew about eighteen inches high." Because the fesque grass association is characterized by a large number of shrubs, ambiguous possibilities exist regarding the "native" condition of the fesque grassland of the bench: (1) genuine mitigating factors such as winter grazing, like that occurring in the Purcupine Hills, produced less intense grazing pressure, or (2) the tall grass described by the enthusiastic Macoun only manifested itself with the sharp decline of the bison in the 1870's - the shrubby cinquefoil reflecting earlier overgrazing.

The condition of the range may also have been significantly affected by fire. Prior to the construction of roads and cultivation of fields, fires were frequent and extensive. In the late 1850's Henry Youle Hind described one such grass fire: "From beyond the South Branch of the Saskatchewan to the Red River all the prairies were burnt last autumn, a vast conflagration extended for one thousand miles in length and several hundreds in breadth...we traced the fire from the 49th parallel to the 53rd and from the 90th to the 107th degree of longitude. It extended no doubt to the Rocky Mountains."

Thus, emerging to complement the description of the physical setting is an image of the total environment which dominated and readily sustained early man. This scene was to change dramatically as exploitation of wildlife and other resources expanded to fill the technological potential and to serve the cultural demands of the white man.

THE PLAIN'S INDIAN CULTURE

With the moderation of the environment following the recession of the Pleistocene glaciers approximately 11,000 years ago, man moved back into the northwestern plains. Prehistoric times have been categorized into three broad stages: Paleo-Indian, Meso-Indian, and Neo-Indian. Historic times may also be characterized by three stages: pedestrian, equestrian, and contemporary.

The Paleo-Indian stage extended from the time the first inhabitants arrived to about 2500 B.C. It was characterized by large, lanceolate points shaped like spearheads. The Meso-Indian stage extended from 2500 B.C. to about 600 A.D.; it was typified by large, side- and corner-notched points. The Neo-Indian stage extended from 600 A.D. to the time of the arrival of the European influence; it was identified by small, side- and corner-notched points, marking the introduction of the bow and arrow. The common perception of early man on the plains utilizes this highly imageable classification and traces the ebb and flow of their wanderings through the veneer of characteristic points scattered across the prairies. Such point types as Scottsbluff, Oxbow, McKean, Duncan, Besant, and Avonlea have all been excavated from sites in Alberta.

Although a variety of points have been unearthed in the Cypress Hills by far the dominant type of artifact association consists of lithic implements comprised of quartzite flakes, cobble tools, and fire treated rocks (Appendix 7, Map 16). Thus, it appears that the primary focus in the Hills was not the wildlife resource but rather the physical resources of the Hills.

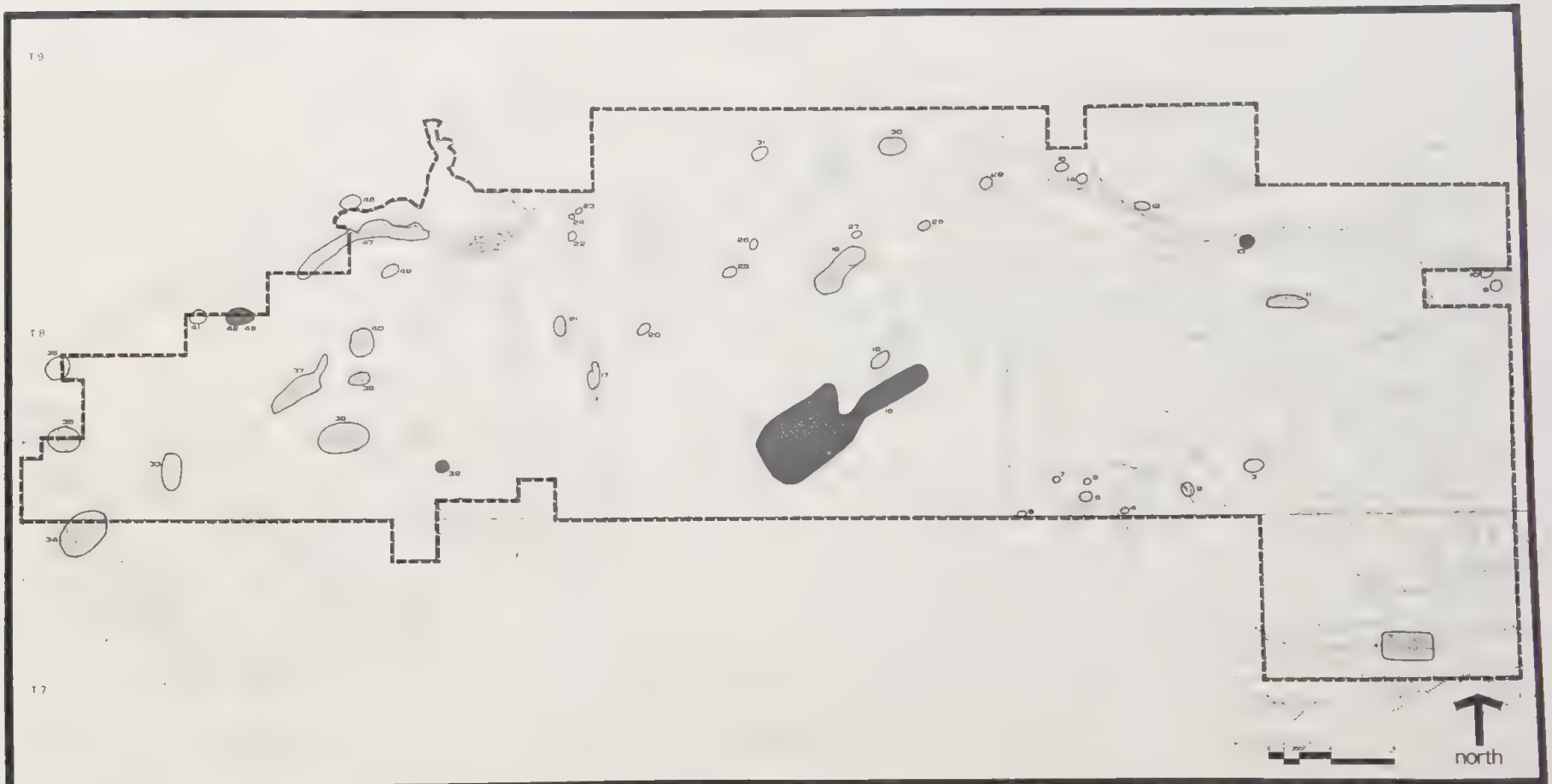
Because of the nature of the artifacts, the primary story emerging from the archaeological work within the Hills relates to tool production and use, and to man's cultural adaption to his environment. Thus it appears that a fuller insight into the cultures of early man will emerge here rather than from the veneer of points marking his persistent quest for subsistence upon the plains. In historic times, the major tribal distribution about the Cypress Hills involved the Blackfoot, Cree, Gros Ventre, and Assiniboine. Because they used tools and hunting techniques similar to the Neo-Indian culture, it is tempting to assume that these Indians were the direct descendents of early man. However, most tribes of the plains had similar life styles, cultural practices, and technologies; thus, tribal distributions may have changed across the prehistoric-historic interface.

The way-of-life of these historic pedestrian tribes as they were observed by the very earliest European explorers such as Henry Kelsey, was at first not too dissimilar from that of the Neo-Indians. The use of the buffalo jump had ensured their food supply, but they were still hampered by lack of mobility; although they had the dog and the travois, they were nomads having to travel on foot. Between 1730 and 1750, however, this changed dramatically. With the arrival of the horse, a legacy of the Spanish of the southwestern plains, the plains Indian culture became an equestrian culture. Upon the dual foundation of the horse and the bison, they built a successful and self-sufficient society which was at its apex when the fur traders encountered it.

Just as the unique resource base of the Cypress Hills outlier within the grassland biome may facilitate greater insight into the cultures of early man, it also facilitates greater understanding of the plains culture of the Blackfoot and other tribes. Table 14 summarizes from historical accounts, the various activities associated with the Cypress Hills recorded for the major tribes.

The type of documentation of these activities is illustrated by the following reference to the sundance ceremony in the mid-1860's.

"In the Green-Grass Moon (June) of that summer, Many Horses councilled with our medicine men and foremost warriors, and they decided that we should make our great, every summer offering to sun this time at Divided Mountains (Cypress Hills)."



LEGEND

MAJOR SITES

- East Battle Creek Site
- South Battle Creek Site
- Grybra Site
- Willow Creek Site (cabins)
- Kajewski Site (cabins)
- Minor Site

ARCHAEOLOGY

Keyed to Table

16

CYPRESS HILLS PROVINCIAL PARK

Alberta

SOURCE INVENTORY ANALYSIS AND CONCEPTUAL PLANNING

Lombard North Group

MARSHALL MACKLIN MONAGHAN LTD

Table 14

Activities Associated with Cypress Hills

	WINTERING	HUNTING	PLANT COLLECT.	WAR/ SCOUTING	SUDANCE	BURIAL
BLACKFOOT	X	X		X	X	X
CREE		X	X	X	X	
GROS VENTRE				X		
ASSINIBOINE	X	X		X	X	X
METIS	X	X		X		

The isolation of the Cypress Hills and the independence of the plains Indians was to preserve this picture of felicity and plenty until the 1870's. Looking ahead to the breakdown of the Indian's traditional ways and their desparate focus on the Cypress Hills provides a dramatic preview of the white man's growing impact on the land.

"Tribal boundaries were a thing of the past. Indian bands and individual camps wandered this way and that, hoping that distant fields would provide relief from the ever-tightening privation pressing upon them. In this constant movement and intermingling, Fort Walsh and the vicinity were a lodestar of hope, and intermediary haven, a possible point of succor between north and south and east and west - in every sense the principal rendezvous...of the Canadian Plains...Crees of the North Saskatchewan hearing stories of massed buffalo in the boundary country, Blackfoot camps in the need and mindful that the headquarters of their redcoated friends might assist them, Assiniboine and Saulteaux ever on the move, as well as troubled and exasperated Sioux, all turned upon the slightest impulse towards the little citadel and trading centre in the Cypress Hills".

In reflection, although the resources of the Cypress Hills were valued by both early man and the plains Indians, theirs was a subsistence economy. The Europeans, on the other hand, brought with them a profit-oriented commercial system. With such disparate perceptions of the natural world it was inevitable that these cultures would clash and that the weaker would be dispossessed amidst significant landscape changes.

THE FUR TRADE

The early explorers, who constituted the vanguard of the fur trade, penetrated the northwestern Great Plains via the two great river systems, the Saskatchewan and the Missouri. As early as the late

seventeenth century men such as Henry Kelsey and Father Marquette and Louis Joliet had begun to explore these arteries, which subsequently became the focus for commerce and settlement. Part of the significance of the Cypress Hills is illuminated by the fact that the actual physical presence of the fur trade did not reach the Hills until 1871, almost two centuries later, when Isaac Cowie of the Hudson's Bay Company established a trading post in the Hills during the winter of 1871-72. This protracted isolation of the Hills resulted in their becoming a sanctuary, or "last refuge", for the wildlife and the free plains Indians in their retreat before the ineluctable advance of the white culture.

Although the Hills were frequented by the Indians and the Metis, the focus of the northern fur trade remained centered on the North Saskatchewan River and the northern forests where the furs were harvested. Several attempts were made, however, to open a southern route along the South Saskatchewan River. In 1800 Peter Fidler established Chesterfield House at the junction with the Red Deer; the site was soon abandoned. In 1822 the Hudson's Bay Company sent the Bow River Expedition up the south branch in an attempt to re-establish Chesterfield House; this endeavor too was soon abandoned. Members from those parties did, however, visit the Cypress Hills. The next thrust into the Cypress Hills came fifty years later with Cowie.

This drive towards the southern Canadian plains failed not only because of poor prospects for the fur trade but also because of the independence of the Blackfoot and other plains Indians and their disinclination to hunt for furs. As described by Alexander Henry the Younger in 1808:

"The country they inhabit abounds with animals of various kinds; beaver are numerous, but they will not hunt them with any spirit, so that their principal produce is dried provisions, buffalo robes, wolves, foxes, and other meadow skins and furs of little value. In summer they chase buffalo on horseback and kill them with the bow and arrows, and in winter they take them in pounds."

This characteristic truculent attitude on the part of the Blackfoot was a factor in establishing the possibility of the Cypress Hills becoming a backwater amidst the waves of advancing settlement.

Even though the attempts to establish the fur trade in the southern Canadian plains were unsuccessful, this region was to become the bulwark of the trade with disastrous consequences. The swift moving brigades plying the northern rivers were dependent on the huge quantities of pemmican harvested from the plains. By the 1860's, however, the subsistence harvesting of the bison and associated animals had accelerated to become commercial mining with numerous factors reinforcing one another to ensure the demise of the bison. The buffalo landscape fell before the combined effects of the horse, the rifle, a commercial economic emphasis, the gold rush, whiskey traders such as those at Fort Whoop-up established in 1868 at the junction of the Oldman and St. Mary's Rivers, commercial hide hunters, the railroad, and settlement. And with the passing of the bison, the destruction of the plains Indians' way-of-life, their culture, and their civilization was ensured.

Dramatic change thus shook the land in the 1870's. Many events marking the transition from the Old West to the Canadian West focused on the Cypress Hills such that this landscape has become a significant symbolic repository for this portion of the Canadian saga. Some of these events include:

1873 Whiskey posts of Abel Farwell and Moses Solomon established in Saskatchewan Cypress Hills.

1873 Cypress Hills Massacre where 22 Assiniboine were killed near above posts.

1874 North West Mounted Police march West from Manitoba.

1875-83 Fort Walsh in operation in Saskatchewan Hills; it became the focus for strategic trails from Fort Qu'Appelle and Wood Mountain to the east, Fort MacLeod to the west, and Fort Benton to the south.

1876-82 Sitting Bull and Teton Sioux take refuge at Wood Mountain; Fort Walsh became the focus for negotiations.

1877 Blackfoot Confederacy sign Treaty No. 7 at Blackfoot Crossing.

1877 Chief Joseph and Nez Perce seek refuge in Hills (captured in Bear Paw Mountains enroute).

1879 Bison virtually eliminated from Canadian plains.

1879 Constable Graburn murdered in Alberta Hills.

Significant as these events were, they constitute the apex of only one eventful period in the history of the Cypress Hills and tend to obscure an equally meaningful aspect of the Canadian cultural experience then emerging, the Conservation Movement.

Concern over the depletion of wildlife surfaced in the late eighteenth century; surveyor-geographer David Thompson perceived this situation as early as 1793 when he wrote:

"Every intelligent man saw the poverty that would follow the destruction of the Beaver, but there were no Chiefs to control it; all was perfect liberty and equality. Four years afterwards almost the whole of these extensive territories was denuded of Beaver, the natives became poor, and with difficulty procured the first necessaries of life, and in this state they remain and probably for ever."

Regarding the bison, observant travellers in the United States in the 1830's were predicting the extermination of the bison. Painter George Catlin observed in 1832 that the buffalo were "rapidly wasting away at the approach of civilized man...in a very few years to live only in books or on canvas." In the Cypress Hills, however, such accounts of depletion did not surface until the 1850's. In 1857 the plains Cree resolved in council that:

"In consequence of the promises often made and broken by white men and half breeds, and the rapid destruction by them of the buffalo...they would not permit either white men or half breeds to hunt in their territory, or travel through it, except for the purpose of trading for their dried meat, pemmican, skins and robes."

To counteract this declining trend, the Hudson's Bay and North West Company, shortly after amalgamation in 1821, introduced conservation measures to conserve the beaver and other wildlife. By 1826 a system of sustained yield was being attempted; growing competition with the Americans, however, rendered this program ineffectual.

With the transference of Rupert's Land to the newly formed Dominion of Canada in 1869, conservation efforts affecting Cypress Hills fell to the government of the Northwest Territories of Canada. In 1877 this government made a forlorn attempt to save the bison by passing an ordinance aimed at reducing the rate of slaughter. These regulations forbade the use of buffalo pounds, the wanton destruction of buffalo at any season, and the killing of animals under two years of ago. The impossibility of enforcing these regulations, however, also rendered this program ineffectual. Nonetheless the Conservation Movement was now sanctioned by procedural precedents.

Although this initial affirmation of conservation principles was not focused on the Cypress Hills per se, it attacked head-on a situation which was manifesting itself most visibly and severely within the Hills. The Cypress Hills because of its distinctive physical and biological character was suffering a particularly pervasive impact on its indigenous resources. Thus, the recurrent theme of man exploiting the resources of the Hills had - in the wings at least - the crucial counterbalance of conservation concern which was to focus directly on the Hills in the years to come.

SETTLEMENT

Foreshadowing settlement were the various government expeditions sent out to assess possible routes for a transcontinental railroad and to evaluate the possibilities for settlement in the northwestern Great Plains. Although the Canadian expedition under Hind and Dawson focused on the eastern Canadian plains, the American Exploring Expedition visited the Hills in 1853, and the British Exploring Expedition under John Palliser travelled to the Hills in 1859. Palliser concisely captured the image of the Hills when he reported:

"The Cypress Mountains formed indeed a great contrast to the level country through which we have been travelling; they are covered with timber, much of which is very valuable for building purposes, the soil is rich, and the supply of water abundant. These hills are a perfect oasis in the desert we have travelled..."

Palliser's report, in addition to leaving a detailed account of the wildlife and landscape of that period, delineated the famous Palliser "triangle" or arid region - roughly coincident with the brown and dark-brown soil zones in the short- to mixed- grass prairie area of Alberta and Saskatchewan. He described the region as "deficient in wood, water and grass" and "not...fitted for permanent habitation of civilized man...a vast tract of country which, with few exceptions is arid, treeless and sandy - a portion of the true American desert." Similar conclusions were reached by Hind and also by John Wesley Powell in his classic Report on the Lands of the Arid Region of the United States. Subsequent history has documented the difficulties of establishing agricultural settlement in this region. Palliser's report had been prophetic; it also illuminates the special value the Hills resources of timber, water, and forage were to have for settlers of the surrounding region.

By the middle 1870's, close on the heels of the prospectors and whiskey traders, ranchers from Montana began to drive their cattle onto the Canadian plains. A further influx of ranchers to the region followed the completion of the Canadian Pacific Railway to Maple Creek, Saskatchewan in 1883. Soon much of the Cypress Hills region was devoted to ranching. Although some ranchers took out leases under the Dominion Lands Act of 1872, most squatted on the land exercising a "gentleman's agreement" approach in their range operations. The revised Dominion Lands Act of 1909, which finally opened up much of this region to homesteading, finally forced the ranchers to request leases to protect de jure their de facto grazing rights. Thus the settlement pattern of the Hills was formalized.

The first white men to settle in the Alberta Cypress Hills seem to have been members of the Louis Sands Lumber Company who located at Elkwater Lake in 1883. The first ranchers appear to have been the Mitchell brothers who settled the Elkwater-Medicine Lodge Coulee area in 1887. Many of the present ranchers represent families who settled in the Hills near the turn of the century and many of these are now represented in the stock associations grazing within the park.

For many of the settlers in the immediate Cypress Hills area, as well as the surrounding region, the resources of the Hills were useful to their operations; this included timber, water, and forage. The scope of this utilization was significant: "Journeys of up to sixty miles or more were made to haul timber. Twenty to forty wagons might daily pass along the main trails to the Hills." In addition, dozens of irrigation projects sprang up throughout the Hills. Hay, too, was hauled great distances beyond the Hills; settlers from several townships to the north went to the benchland for hay to supplement their supplies. By the turn of the century, the unregulated demands placed upon the timber and the resulting instability of watershed conditions threatened their depletion on a scale comparable to that of wildlife. In 1893 Superintendent Jarvis of the N.W.M.P., Maple Creek District, reported: "the supply (of timber) in the Hills is rapidly getting short, owing to the encroachments of settlers and destruction by fire." At this time it was apparent to most concerned obser-

vers that the community timber and water resources of the Hills would require regulation if the renewable resources were to be utilized on a sustained yield basis.

This atmosphere of laissez faire exploitation was not only sanctioned by prevailing attitudes but was the tacit policy of the Macdonald government after its return to office in 1878. The objective was to forge a Canadian nation as swiftly as possible; the tools of this policy in the West were the transcontinental railway, liberal immigration policies, free homesteads, and the abundant natural resources of the region. Although concern over the wanton and wasteful exploitation of these resources surfaced in the 1890's, it was not until 1906 that the Conservation Movement was to gain public prominence and sanction.

CONSERVATION

While the sweeping events of the late nineteenth century were transforming the Old West (which retained its character longest in the Cypress Hills), events with a very modern flavor soon began to affect the Hills.

The concern which had manifested itself over the exploitation of natural resources soon led to the establishment of a number of forest reserves beginning in 1894. In 1906, however, events of major import both nationally and for the Cypress Hills thrust the conservation movement into the public arena. These included: (1) the Canadian Forestry Convention which gave wide exposure to conservation ideas and strong impetus to governmental action, (2) the Dominion Forest Reserves Act, established:

"for the maintenance and protection of the timber growing or which may hereafter grow thereon, for the protection...of the animals and birds therein, and the fish in the waters therein, and for the maintenance of conditions favourable to a continuous water supply."

and (3) the creation of the first Cypress Hills Forest Reserve comprised of 18 sections in T8, R3, W4, Alberta.

The international backdrop for these events of national significance was the conservation movement in the United States. There a spirited debate had surfaced between John Muir, and the Sierra Club which he helped found in 1892, and Gifford Pinchot, Chief Forester of the U.S. Forest Service. Muir was staunchly advocating the aesthetic argument for landscape protection and preservation, while Pinchot became the spokesman for the "wise-use", or utilitarian, argument for conservation; President Theodore Roosevelt, of course, was instrumental at that time in effecting conservation action in the public sphere.

Conservation was becoming the issue of the times. This led, in 1909, the the North American Conservation Conference involving the United States, Canada, and Mexico. This conference in turn led to further affirmation of conservation in Canada: (1) the establishment of the Canadian Commission of Conservation in 1909, (2) the passage of the Dominion Forest Reserves and Parks Act in 1911, in which a distinction was now drawn between reserves where conservation or wise-use was emphasized and parks where landscape protection was the primary emphasis, and (3) the inclusion of the remainder of the Cypress Hills forest resource (in T8, R1, & R2, Alberta) within a federal forestry reserve.

Later, when the Hills would be designated a Provincial Park, some of the carry over, multiple-use problems would date from this period; namely, the administrative ambiguity between the Forestry Branch and the Timber, Minerals, and Grazing Branch which would see the latter sanctioning commercial timber berths and in 1913, grazing permits.

Also, the inordinate concern over "fire-proofing" the forests and its later role in reinforcing grazing and fire protection evolved during this period.

With the transfer of control of natural resources to the provinces in 1930, the Cypress Hills Forest Reserve became the Cypress Hills

Provincial Forest. It was administered under the Alberta Forest Reserves Act of 1931, whose intent was similar to the federal legislation; the Alberta reserves were:

"for the maintenance, protection, and reproduction of the timber thereon, the protection of animals, birds, and fish therein, and for the maintenance of conditions favourable to a continuous water supply."

Although the Elkwater subdivision was withdrawn from the reserve in 1938 and established as the Elkwater Provincial Park (comprised of 111.79 acres) in 1945, the Cypress Hills Provincial Park itself was not established until 1951. The Provincial Park Act of that year defined the purpose of the parks as:

"for the pleasure, recreation and general benefit of the inhabitants of the Province and for the conservation, maintenance and protection of animal, bird, and fish life therein, and the preservation (of all areas and objects therein) of geological, ethnological, historical or other scientific interest."

The revisions of 1954 and 1964 retained this emphasis which was further emphasized in 1967:

"The fundamental and important obligation in the administration of parks is to preserve from impairment all significant objects and features of nature in the park and its natural recreational activities and developments in perpetuity."

Although periodically revised, the implementation of the new "park" emphasis was effectively undermined from the beginning by provision within the act for multiple-use involving lumbering, grazing, and other uses. In the absence of policy guidelines concerning such uses the Park's advisory committee, the stock associations, and the various recreational associations gained a large measure of independence in decisions respecting their activities and consequently now constitute strong vested interests who view their activities as traditional and in some cases integral to their operations. Although commercial lumbering was terminated in 1967, only in 1973 was a firm position taken with regard to other multiple-uses, such as townsites, rodeos, and private cottages, which are now viewed as conflicts in new parks. Resource development, such as grazing, still receives tacit sanction with provision now, however, for strict supervision. In short, Cypress Hills Provincial Park has essentially continued to be managed as a multiple-use forest reserve and never as a park in the modern sense.

DECISIONS FOR TOMORROW

The crux of establishing a modern posture with regard to Alberta's Cypress Hills Provincial Park focuses directly on the multiple-use problem. As indicated in the introduction to this section, the land-use history of the Cypress Hills has an important place alongside the physical and biological criteria in developing the Park theme and the recreational emphasis.

As developed in the discussion the original, or natural, landscape of the Cypress Hills ended with the passing of buffalo days. With the disappearance of the bison and the subsistence cultures of the Indians, European man became the dominant ecological force, and the on-going cultural significance of the landscape became essentially liked with his attitudes and actions.

Because the resources of the Hills have always been of value to the people of the surrounding region they have been extensively exploited. In the laissez faire atmosphere which prevailed initially, the bison and the timber and water resources were threatened with depletion bordering on complete destruction. Countering this impact, or tendency, were the fur conservation practices attempted by the Hudson's Bay Company, the protective

ordinances enacted by the Northwest Territories Council, and the various Forest Reserve Acts. Although commercial overtones were partially involved, these actions heralded the awakening of man's concern for the healthy functioning of selected facets of the natural landscape; they represented a significant change in his attitudes towards the land.

Today this concern is manifesting itself in the assessment of the recreational carrying capacity of the Cypress Hills landscape as recreation begins to emerge as the dominant use of the area.

Standing unresolved and as an anachronism, however, is the grazing issue. The rangeland within the park is overgrazed; additionally the trend in the range conditions is downward. To argue that grazing has always been a part of the landscape, whether it be cattle or bison, is to ignore the meaning of the landscape in terms of the Canadian thrust towards a meaningful conservation stance; the conservation issue with bison was wildlife destruction; the conservation issue with cattle is grassland destruction and park-value depreciation. If the conservation tradition which is now a part of the park's image (and which could add rich meaning to this Canadian landscape) is to be affirmed, the highest quality of landscape management must be ensured. Adherence to present range practices abrogates the story the Cypress Hills could illuminate in terms of the evolving conservation awareness aspect of our cultural heritage.

Traditionally, three consistent themes have pervaded park policy: nature preservation, historic preservation, and outdoor recreation. Today, two new themes are taking shape, reflecting deep-seated national concerns: (1) the need to preserve the total cultural heritage of the nation, in all its diversity, and (2) the need to gain a better understanding of man's role in the ecosystem, and to shape his activities in recognition of ecological constraints.

The Cypress Hills is emerging as a landscape of national - even international - significance. Writing's such as Stegner's Wolf Willow, Nelson's The Last Refuge and Scace's land-use history analysis, are thrusting this landscape into significance and into the national consciousness. Additionally its implications relative to Sitting Bull, Chief Joseph, and the American Indian history of the West are giving this landmark international prominence.

In terms of environmental education the land-use traditon, as well as the present problems, in the Hills illustrate better than most areas the interaction of man and the landscape as well as the ecological concept of carrying capacity. In this respect, interpretive programs focusing on carrying capacity would be appropriate in that it illuminates this inter-relationship between man and the natural world.

Ultimately, such an emphasis leads to Aldo Leopold's "ecological conscience" or "land ethic", as all sound land management programs should:

"The Land ethic simply enlarges the boundaries of the community to include soils, waters, plants, and animals, or collectively the land...a thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise."

Parks Management today thus has a unique opportunity to exercise initiative and leadership in affirming this deeper and urgent use of parks in cultural interpretation and environmental education.

PERCEPTUAL UNIVERSALS

PHYSICAL INVENTORY

PHYSICAL ANALYSIS

ASSOCIATIVE VALUES AND USER PERCEPTION

● VISUAL INVENTORY / ANALYSIS

The best foundation for a visual analysis is one based upon the principles of environmental psychology. Such an approach accommodates the deep psychological needs of man rather than the merely aesthetic preferences developed by most visual, or scenic studies. This approach thus provides the greatest potential for objectivity and comprehensiveness and represents the most up-to-date theories in the field.

A visual analysis must be thought of as a perceptual analysis: an examination of the ways in which people perceive and respond to their environments. "Environments", in this sense may be physical, cultural, or psychological. This analysis focuses upon those having a physical manifestation, but the other aspects also come into play.

An analysis of visual resources must take cognizance of the fact that the perceptual process is a dynamic one. This process involves not only the visual environment itself, but also the observers of this environment with all of their capabilities, limitations, biases, and tendencies.

First come the basic needs that must be satisfied for the maintenance of life and security. Only after these are met can the people turn their attention to higher, finer needs involving issues of image and aesthetics.

The elements having a bearing on this analysis are as follows:

1) The innate psychological needs and tendencies universal to most human beings with respect to their environments: the perceptual universals.

2) The visible natural and cultural components of the physical environment and the abstract structural elements that may be infered from these components.

3) Existing and potential subjective associations, expectations, preference profiles, and levels of understanding that users, or certain groups of users, bring to an environment.

A varied selection of tools and techniques may be utilized in conducting an inventory of visual resources. The methodology selected for this study consisted of a combination of extensive field work balanced with examination of various resource maps (especially vegetation, topography, elevation, and landform), air photos (photo mosaic, stereo pairs, and aerial oblique), and ground photography. Every effort was made to maintain an accurate perception of the environment that could be related to the graphic aids by continual reference to the latter while in the field and by continual reference to the former (in the form of photos) while in the office. Finally, perceptions and prejudices of the evaluator were checked by comparisons with those of other individuals of different backgrounds and persuasions to assure optimum objectivity.

In this study, the general considerations for perception of the visible environment are first defined in a discussion of perceptual universals and their ramifications. The physical context of perception in the Cypress Hills is then presented in the inventory and analysis of the physical environment found there. This environment is perceived, first of all, as an entity distinct from its surroundings due to its image within the region. Then, within the environment various forms of subdivisional breakdowns occur in terms of perceivable visual zones or areas. These visual zones are generated by various elements within the landscape and the ways in which these elements can be perceived in the mind of the observer. Identifying and understanding these zones not only helps one understand what we have in the Cypress Hills; it also establishes a framework for analyzing and projecting the impact of management policies upon the visual environment.

Further insights into the visual resources and perceptual structure of the park are found in an examination of the visual features the park user can identify and organizational elements he can use to relate these in a mental conception of the park.

All of the above elements, having been inventoried for the study area, are analyzed for their strengths and weaknesses, harmonies and conflicts. The distinctive characteristics of the existing

park users are also examined as they have a bearing upon the perception, use and appreciation of the park's visual resources.

Finally, conclusions are presented regarding the visual resources of the Cypress Hills and the management of these resources. These conclusions must, however, be weighed in consort with the other requirements of the park resources such as the geological and biological support potential. Generally speaking, however, what is good for the preservation of a healthy environment is good for the maintenance of a visually-rewarding environment.

PERCEPTUAL UNIVERSALS

These elements can be broken down into those which are fundamentally universal and unchangeable and those which are variable overtime and changeable within different groups or individuals.

The universal elements can be identified as primary psychological needs of people with respect to their environment. The degree to which an environment fulfills these needs determines to a large extent whether or not people will respond favourably to that environment. These needs are a function of the most essential biological requirements and capabilities of man and of his most primeaval behavioural traits, some of which he still shares with the lower animals. They are as appropriate for the harried city dwellers as for the cave man in a subsistance economy. These needs are as follows:

Coherence

An environment must be comprehensive or a people will feel insecure, or even threatened within it.

People have more or less unconscious techniques for organizing environments in their minds in order that they may formulate the basis for successful action within these environments. This involves not only the physical process of seeing, but also of understanding what is seen, of evaluating it, and placing it in a conceptual framework or "mental map" of the environment that the observer utilizes to shape his actions and to colour his perceptions in an emotional sense. According to Kenneth Polakowski, "Perception of the environs is a creative act of interpretation on the part of the observer. It is truly a participatory activity through which man seeks harmony with his environs."

As a rule, environments which can be understood by the observer are more pleasurable to experience than those which are incomprehensible. The latter may even seem threatening. This is because of the difficulty a person experiences in attempting to assemble his cognitive model or mental maps, and the anxiety he experiences before assembling it. ("What's that? Where am I? What's going to happen next?") Without such a map, he has trouble recognizing elements, predicting events, evaluating whether what he encounters will be good or bad, and acting in a logical and purposeful manner. The ease with which they can form these maps is a function of the clarity of the individual structural elements, the completeness and the consistancy of the system that relates them, and the level of sophistication of their previous knowledge. Disruptions of the natural system of the landscape will increase the difficulty people have in comprehending it. It is possible, however, to establish a well organized man-made system that harmonizes with the natural ones. A coherent environment is a joy to perceive.

Perceptual Stimulation

The perceptual mechanism, in fact, requires some exercise or boredom occurs. This stimulation can come from variety within a scene or among several related scenes of a sequence. It can

also be in the form of mystery: a scene which requires active involvement of the observer for comprehension.

People have a need for certain types and amounts of perceptual stimulation from their environment. (Rappaport and Kantor). Too much stimulation or too garish a stimulation - such as the type and level of stimulation found in large areas of most cities - causes a negative reaction. Too little stimulation, such as the typical suburban development or a rather barren prairie landscape, will produce a form of sensory deprivation. Unusually high or low levels of stimulation may be tolerated or even enjoyed briefly if they occur as short duration novelties - such as a trip to an amusement park or to the barren arctic tundra. However, the optimum stimulation for most people is found in variations upon the type of landscape in which man developed during his first one or two million years in Africa: a natural landscape with a spatial articulation between enclosed forests and open savanna, similar to what is found in aspen groveland and the areas of prairie surrounded by forest at Cypress Hills.

Shelter, Freedom and Privacy

Man needs the security of sheltered locations, but these must be balanced with options for free-ranging movement or they become confining.

Edges or transition zones, for example, are vitally significant not only because they clarify structure - showing clearly where one thing or area ends and another begins - but also because they serve a primal need for shelter. (Figure 7).

> "Dutch investigations have found that visitors to parks and other recreation areas tend to concentrate in transition zones where two different kinds of terrain merge (seacoasts, banks of rivers, edges forests) and expanses of open spaces in front. Preferences for freedom and privacy are also reflected in an attraction for cover and panoramas."
> (Pfeiffer)

These needs are best served in situations in which the individual is able to seek out privacy or social intermingly at his own option - a balance of solitude and society. An ideal situation, for example, would be a combination of secluded camp and picnic sites with more open meeting areas not far away.

Territory

Men, like all animals, have territorial needs. Ideally, these are manifested in a hierarchy of territories, or recognizable spaces in which the individual can place himself and his group and feel secure. Needs for territory come to bear in types of spaces and cover people seek out and the ways that become appropriate for utilizing parks. Various sizes of plots of turf defined by enclosing vegetation and isolated from the main traffic stream are ideal. One finds such spaces in aspen groveland and in clearings within a forest.

Overcrowding and other violations of territorial needs will tend to produce tension in the park users and may spoil their recreational experience. For example, motorized vehicles, especially the noiser and more intrusive ones like motorbikes and snowmobiles, fill up a given area more rapidly because of their relatively large spheres of influence. They also "use up" the area more rapidly than than hiking, cross country skiing, or picnicing because of the damage they cause. It is difficult for the park user coming after them to delude himself into believing that he is "discovering his own unspoiled spot". (Figure 8).

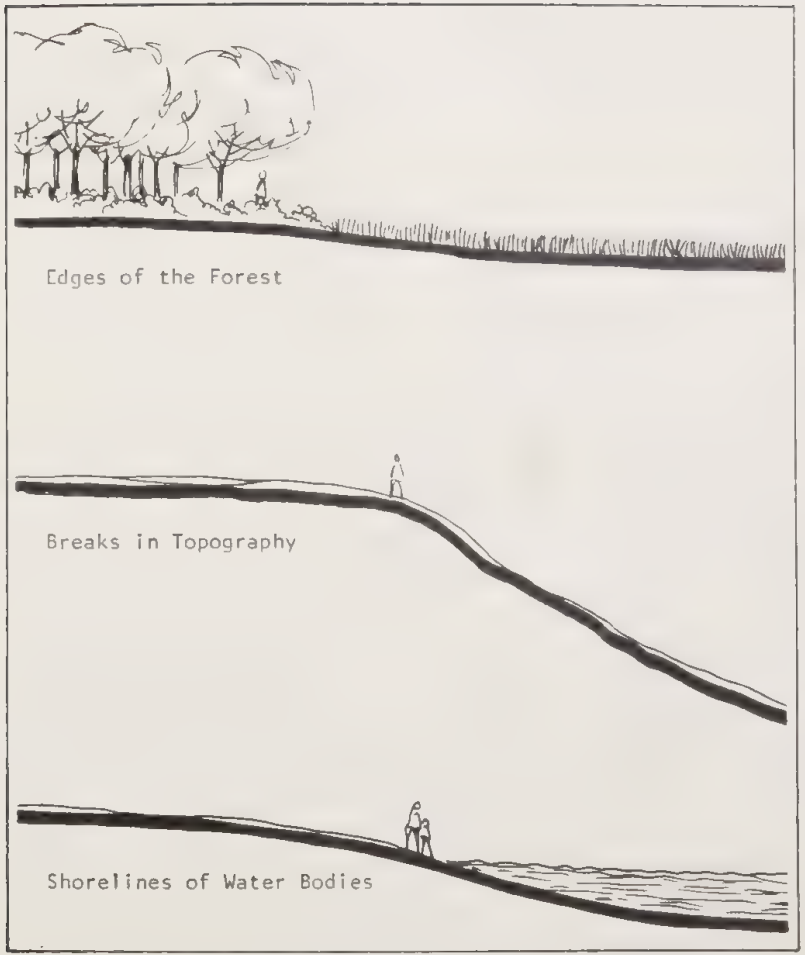


Figure 7: Natural Edges

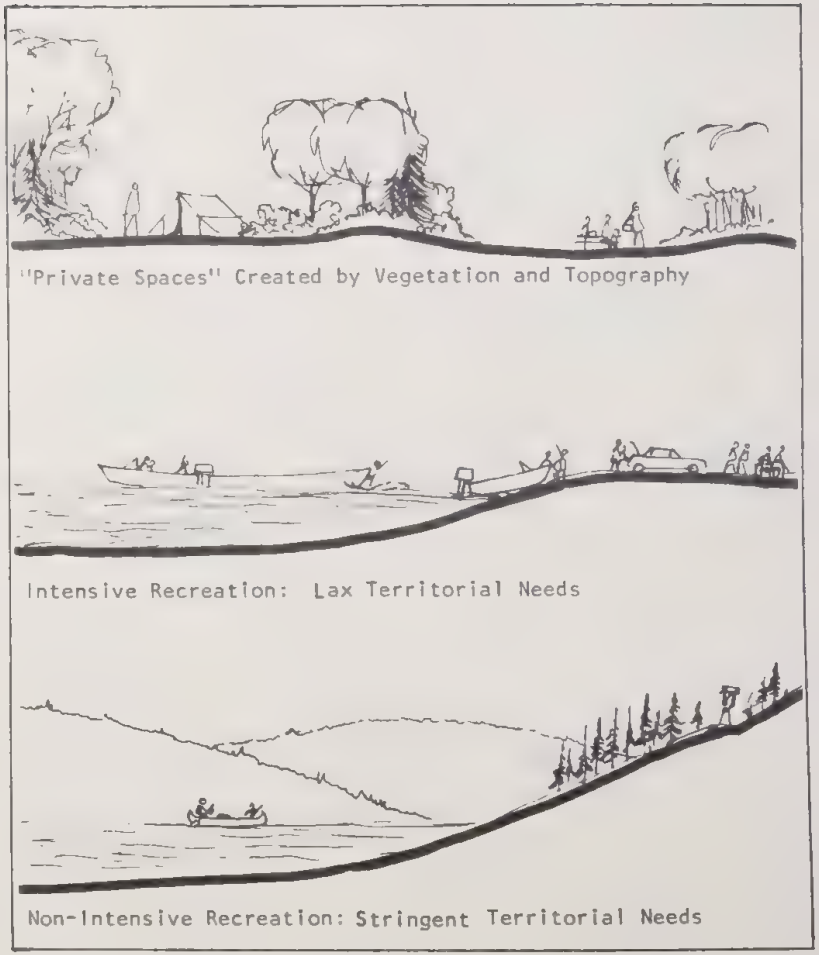

"Private Spaces" Created by Vegetation and Topography
Intensive Recreation: Lax Territorial Needs
Non-Intensive Recreation: Stringent Territorial Needs

Figure 8: Territorial Considerations

THE PHYSICAL INVENTORY

Image Within the Region

> "Every landscape has its own character and patterns, its own scale and its own range of tone and colour. This character is based on the facts of geology and climate and developed through the history of land use . . ."
>
> - Sylvia Crowe, Forestry in the Landscape

The Cypress Hills is an area rich both in history and in prehistory, but it is the comtemporary landscape that concerns us in this instance.

The Cypress Hills represents a striking departure from the surrounding prairie landscape. In essence, the site consists of a flat grassy plateau rising gently from south to north and dropping off abruptly on the northern edge. The steep scarps and coulees of this northern edge, unlike the flat to rolling regional grassland landscape, are densely forested. (Photo 15). At the edge separating the flat grasslands from the forested slopes marvelous panoramas are available of the surrounding country. (Photo 16). It is this sharp break in landform and vegetation, and these panoramas which characterize what is truly distinctive about the Cypress Hills. Each aspect becomes all the more powerful in contrast with the other.

Perceptual Zone Components

Perceptual zones are significant for a number of reasons. An ability to break the park site down into a number of perceivable units assists park user and manager alike. With a knowledge of such units or zones, the park user's level of comprehension and orientation within the park would be much higher. He would thus be more likely to achieve complete and satisfying recreational experience. The park manager with such a knowledge would have a better grasp of the structure of the park and the characteristics, problems and potentials of the various zones within it.

There are a number of different ways of defining such zones. The approach followed in this study utilizes a combination of a number of developed techniques of landscape analysis in addition to some new interpretations.

The type of zone division sought for general planning purposes is one which involves the simplest breakdown of the study area into identifiable units. A person moving from one zone to another would have a significantly different experience and would perhaps exhibit different behaviours as well. For certain types of more detailed site planning, a finer breakdown of zones into smaller, more tightly-drawn subzones may be required. These subzones are too fine for most purposes, however, they can be thought of, instead, as variations with a zone that help to establish its particular flavour.

Perceptual zones are thus derived from the following components:

* Landscape Type: determined by elements of landform (essentially unchanging geomorphology) and of land use pattern (biological and cultural patterns that are super-imposed upon the land).

* Landscape Character: the particular visual emphasis of the landscape (on panoramas, features, details, a sense of enclosure, etc.).

* Landscape Visibility: established by the concepts of "viewshed" and "visual penetration". This component is basically concerned with the size of the area viewable

from significant points within the zone and with the level of transparancy or opaqueness relative to views possible from one point to another within the zone. Vegetation, topography and relative elevation determine this.

* Systems and Features: the zones have certain systems, features and other analytic elements which define them in terms of boundaries and structure such as the linkages, routes and distinctive elements.

* Image: finally, each zone has an overall abstract image that develops as a consequence of certain cues and patterns within it. These determine whether the typical observer would perceive it as natural, man-disturbed natural, pastoral or urban, or some variation thereof. Also, isolated conflicts may be noted to an overall image for a zone which may require action on the part of the park management.

These elements were inventoried and analyzed for the Cypress Hills as follows:

Landscape Type

First of all the landforms are considered. These are essentially unchanging on a human time scale, being altered only by the grossest of activities and catastrophies such as strip mining and volcanic eruption. At the Cypress Hills, these are manifested as:

* The plateau or bench: the large, flat, upland area of the Cypress Hills.

* The slopes: the steep, primarily northern edges of the plateau.

* The valley bottoms: the flat low lying areas (mainly meltwater channels) found at the base of the slopes and dominated by the latter visually.

* Open water: the lakes and reservoirs of the area.

Then the land use patterns are super-imposed upon the above. These patterns are more flexible and changeable and have been altered many times in the history of the Cypress Hills, both by man and by nature. They are characterized for the study area by:

* Forested areas consisting of aspen groveland, deciduous forest, coniferous forest and mixed wood.

* Prairie areas consisting of grassland, shrubland, or some combination of the two.

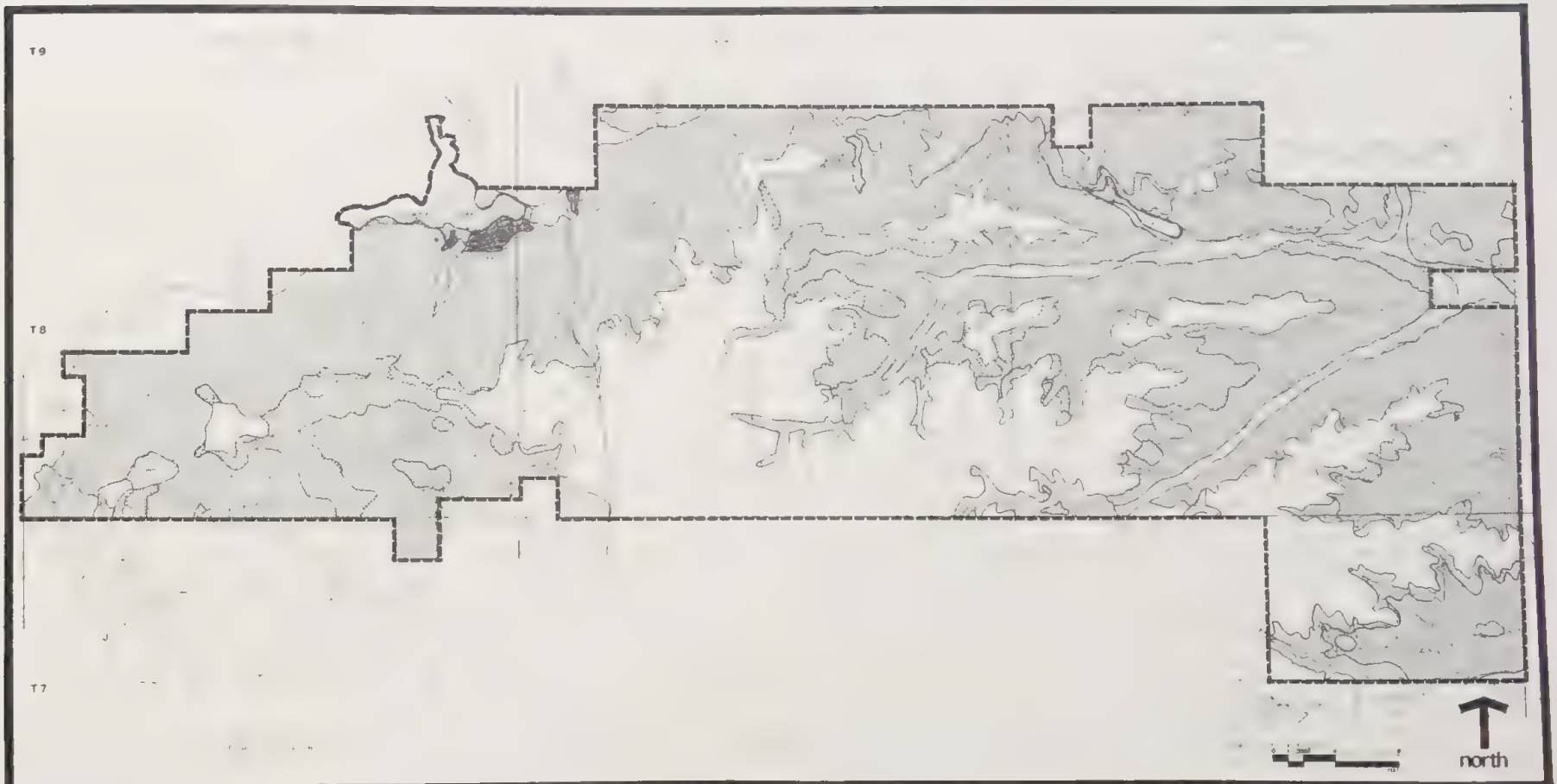
* Marshland.

* Developed, built-up area (i.e. Elkwater townsite).

The possible landscape types are indicated in Table 15 where they are further divided into the generalized types for rough conceptual purposes and the more detailed specific types for more percise site-specific planning. These types are easily derived from the other geological and biological inventory material. They are instrumental in the analysis to determine the environmental impact of an attractiveness for, various potential activities and uses for the park.

The conceptual Landscape Types are illustrated in Map 17. The more detailed specific landscape types are too complex to be shown at this scale but are discussed in the Perceptual Zones descriptions at the end of this subsection. They may also be found in the Planning document in relation to certain more limited sites.

All of the pertinent landscape types for the Cypress Hills are described below.



LEGEND

FOREST
- On the bench
- On slopes > 5
- Valley bottom

PRAIRIE
- On the bench
- On slopes > 5
- Valley bottom

OTHER
- Built up area
- Lake
- Marsh

VISUAL ZONES

17

CYPRESS HILLS PROVINCIAL PARK

Alberta
- DEPARTMENT OF PUBLIC WORKS
- DEPARTMENT OF LANDS AND FORESTS -
- PROVINCIAL PARKS DIVISION

Lombard North Group

MARSHALL MACKLIN MONAGHAN LTD

Table 15

Landscape Types at the Cypress Hills

Conceptual Types		Specific Types
Prairie	On the Plateau	with grassland with shrubland
	On the Slopes	with grassland with shrubland
	On the Valley bottom	with grassland with shrubland
Forest	On the Plateau	with aspen groveland with deciduous forest with coniferous forest with mixed forest
	On the Slopes	with aspen groveland with deciduous forest with coniferous forest with mixed forest
	On the Valley bottom	with aspen groveland with deciduous forest with coniferous forest with mixed forest
Special	Open Water	
	Marshland	
	Developed, built-up areas	

1) Prairie Areas

Covered in grassland or shrubland these zones are characterized by a consistancy of texture and tone. Such zones are extremely transparent. Any element, especially any vertical element introduced immediately becomes a focal point and may disrupt the purity of the experience if it is not in keeping with the natural landscape.

Prairie Plateau: This is the dominant zone of the bench. It sets the stage for the drama of the slopes and forests and captures the essence, the stark simplicity, of the prairies or the plains. There is no middle ground in this zone. Attention of the observer is directed either to the grasses, flowers, and small animals near his feet, or to the sky, or to distant features. (Photo 17).

Prairie Slopes: These areas have higher visual interest due to their variety of form, the play of shadows across them, and the potential for mystery they can engender ("What's beyond that hill, in that depression?") , (Photo 18, background.) They provide possibilities for vistas and panoramas. Management structures and activities are more visible since they are seen elevated as on a pallet.

Prairie on the Valley Bottom: This type of area is of fairly low interest in itself, but it forms a neutral stage upon which the more dynamic features of the slopes can present themselves. (Photo 18, foreground).

2) Forest Areas

These may take the form of aspen groveland, or aspen, spruce, deciduous, pine, or mixed wood forests. They all share a tonal

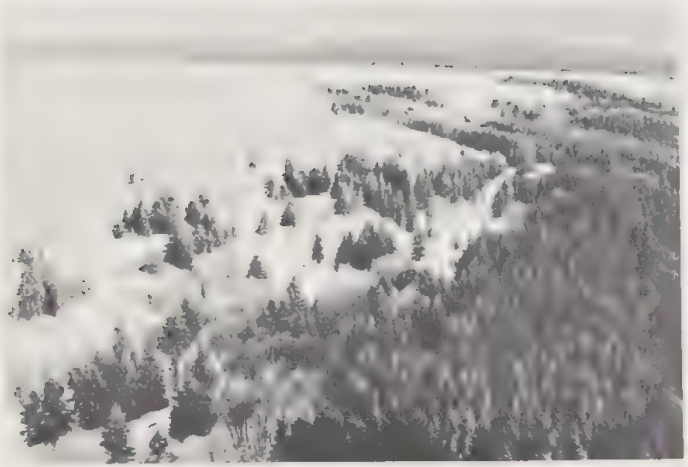


Photo 15. The edge of The Bench.

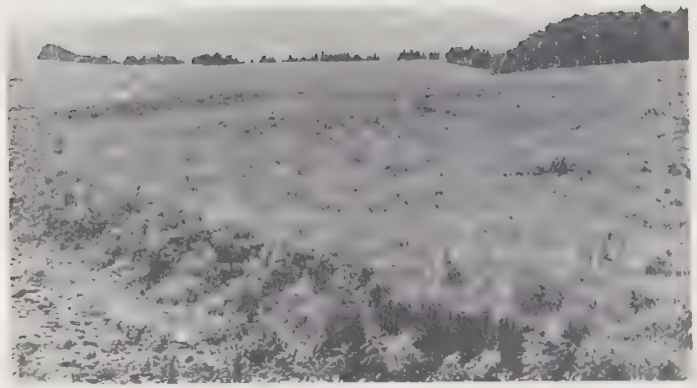


Photo 16. Panoramic view west toward Eagle Butte from Murray Hill

Photo 17. Short grass prairie on The Bench.

Photo 18. Prairie grassland on a slope at Highway 48 near Elkwater Lake, White Tail Hills zone.

and textural variety, though the mixed forest have this to a much higher degree than those with a single species. (Photo 19 and 20). Also, the deciduous and mixed forests have the aspect of seasonal change to consider, both the positive implications of variety and contrast in the changing colours from spring through fall and the negative ones of reduced visual and audial interest (no fluttering aspen leaves) in the winter.

There is a greater opportunity in the forest areas to blend in activities, trails, and small structures because of the natural screening. This must, however, be sensitively done.

Areas with aspen grovelands have especially high visual interest because of their spatial, textural, focal, and scaler variety as well as the inter-plays of shelter vs. openness and mystery vs. clarity they contain. In fact, this type of area comes as close as possible to the optimum primal landscape described by Pfeiffer and by Watt: a natural landscape with spatial articulation between enclosed forests and open savanna similar to the ancestral landscape of early man in his first million years (Photo 15 and 20). The interest and screening capability (or visual carrying capacity) of forest areas also vary as a consequence of their visual penetration potential as will be seen below.

Forests on the Plateau: Forests of this type are limited in extent but provide much needed interest and scale. They often occur, however, more as edges to the grassland areas rather than as areas in themselves (Photo 17).

Forests on the Slopes: This type is much more common at the Cypress Hills and constitutes, with the prairie plateau, one of the two dominant landscape types. Here, the added vertical dimension enhances the variety, imagability and potential for spatial definition of the forests (Photos 19, 20, 33, 42).

Aspen groveland, especially, attains its full potential as a dynamic landscape.

Forests on the Valley Bottom: If aspen groveland, such areas are similar to those on the prairie valley bottom, though with much added interest in the middle ground elements with views provided by the clumps of aspen. (Photo 20). In the case of the other forest species, the forested valley bottoms are basically continuations of the forested slopes. (Photo 19).

3) Open Water

This area is extremely high in visual interest because of the changeableness of the fluid medium in response to light and weather. Also of note is the significance and clarity of the transition from water to land at the edge - an important orientation element. Bodies of water fill the mind of the observer with vivid connotations and associations, perceptual memories incorporating all of the senses and bringing thoughts of swimming, fishing, boating, and may other images. (Photo 25.) For the observer on a lake or a shore, the open water forms a distinctive area in its own right (Photo 43). From a distance, the lake forms a significant visual feature and often dominates the view. (Geology Section, Photo 6).

4) Marsh

Although small in size at Cypress Hills, the marshes and sloughs are important because of their contrast with the semi-arid environment about them and because of the wildlife they attract. (Wildlife Section, Photo 14).

5) Developed, Built-up Areas

There is only one of these of consequence at the Cypress Hills, but it is fairly extensive: the Elkwater townsite (Photos 22, 23, 24). Here the man-made dominates the natural with the consequences often being caotic in terms of either aesthetics or perceptual organization. Not all of man's structures need negative, however. Some of the old ranch structures in the region have a mellowness and appropriateness in the landscape (Photo 34).

Landscape Character

The second component of this visual zone system is less easily defined. It's primary characteristic is that of emphasis: to what element or elements of the landscape is the observer directed and why. The possible landscape characters have been developed by R. Burton Litton and are as follows:

* Panoramic
* Feature
* Enclosed
* Focal
* Canopied
* Detail
* Ephemeral

Their definitions and their occurrances in the Cypress Hills are listed in Table 16.

Landscape character is essentially based upon the techniques through which people perceive their environment and organize it into mental maps. Many of the universal psychological needs may be seen to have a bearing upon it.

Landscape Visibility

Landscape type and character of a visual zone are components which may be modified with respect to a given site within that zone as a function of the landscape visibility. To be experienced, the landscape must be seen (non-visual perception generally assumes a secondary supportive aspect).

This visibility is of three types:

* What can be seen within the zone from external points
* What can be seen within the zone from internal points.
* What can be seen outside the zone from internal points.

First, there is the concept of viewshed as developed by Jones and Jones (Figure 9). This concept is similar to that of the watershed. A viewshed consists of all that one could theoretically see from a given point, especially from important points such as a vista viewing sites, significant activity concentration areas and points along a given circulation corridor. (Figure 10). Since vegetation is considered as a changeable aspect of the landscape in establishing a viewshed, one considers what could be seen with the land form or topography as the only limitation.

This further aids in the establishment of visual zones since if one tends to see the same things together in a given view and/or if the same things tend to reemerge in views from a number of viewpoints, those things and those viewpoints are thought of as being together in a given zone.

Photo 19. Mixed forest and aspen groveland on slopes and valley bottom, Graburn Creek zone.

Photo 20. Aspen groveland on valley bottom; aspen and mixed wood forests on slopes at Murray Hill.

Photo 21. Elkwater townsite water tower across Elkwater Lake.

Photo 22. Elkwater townsite cottages.

Table 16

Landscape Characters - Definitions and Considerations

Landscape Characters*	Management Considerations
Panoramic Landscape: Here there is little or no sense of boundary restriction. Foreground or middleground objects do not substantially block viewing of background objects. Flat, horizontal planes such as seas, rolling prairies, or far-off mountains are typical forms of the panoramic landscape.	Efforts should be made to control the visual quality of the area incorporated within the panoramas keeping in mind that it will be viewed from above. Important vista points for panoramas should be protected at all costs from foreign intrusions, especially those between the observer and the view.
Feature Landscape: This landscape is dominated by a feature object or a group of feature objects. What constitues a feature object is relative; it may be a great mountain or a tree on an otherwise treeless plain. If the mountain or the tree is to qualify as a feature, the objects which surround it must be visually subordinate to it. Landscape features are sometimes called "landmarks" and are given local names such as "Three Sisters", "Lone Pine", "Twin Lakes", etc. Thus a feature landscape always contains a visually important landmark which serves to orient visitors within it.	Since the central feature of such a landscape receives so much attention efforts should be made to preserve it from degredation. Its significance should also be noted in preparing educational and orientational material.
Enclosed Landscape: Spaces, large or small, are here surrounded by continuous groupings of objects. Examples include meadows or small lakes surrounded by "walls" of trees or earth forms. The grass of the meadow or the surface of the lake, for instance, constitutes a "floor". Enclosed landscapes are normally defined by these wall and floor characteristics. When wall definition is lost because of distance, the panoramic classification is more appropriate.	Such landscapes have great potential for fulfilling territorial needs if properly utilized.

Table 16 continued

Landscape Characters*	Management Considerations
Focal Landscape: Focal landscapes, such as river gorges or roadways through forests, tend to converge upon themselves as distance increases or as they curve horizontally. Focal landscapes can occur anywhere that landforms, vegetative patterns, or waterways lead the observer's eye to a point of convergence. A feature terminus at this point of convergence tends to emphasize a focal landscape.	Because of the great emphasis placed on the terminal focal points of focal landscapes, great caution must be exercised in the management of elements at these points. (Figure 10)
Canopied Landscape: A canopied landscape is characterized by an immediate overhead plane such as the tree crown cover within a forest. Best comprehended on foot or at low speed, this landscape type is small in scale (relation of observer size to seen-object size). The motoring public normally sees the canopied landscape as a tree-enclosed roadway with rapidly changing patterns of light and shadow.	The existing canopied experiences should be preserved for their comforting sheltered quality and, especially at Cypress Hills, their rarity.
Detail Landscape: A detail landscape is tied to the immediate foreground. It demands a pedestrian pace and an eye for special amenities to be fully comprehended. Minute segments of forest or prairie ground planes, individual objects or parts of objects, and their visual relationships to each other typify this landscape type. To the knowledgeable observer, detail landscapes consistently reflect the general landscapes within which they exist.	This is one of the most interesting aspects of the prairie landscape. It is essentially a problem of education and interpretation although efforts at preservation are also required: retaining native grasses rather than introducing exotics, for example.

Table 16 continued

Landscape Characters*	Management Considerations
Ephemeral Landscape: Five groups of influences produce ephemeral effects in the landscape - or for brief periods cause the ephemeral landscape to exist. These groups and examples of each follows: 1) Atmospheric and weather conditions (clouds, hoarfrost, fog, sunrises, sunsets). 2) Projected and reflected images (shadows, mirror images of objects by still water). 3) Displacements (fallen leaves, floods, windblown objects). 4) Signs (animal and bird tracks, spider webs). 5) Animal occupancy (animal sightings).	This, too, is largely an interpretive issue. It also provides further justification for the preservation of wildlife, however.

* This column from R. Burton Litton.
Forest Landscape Description and Inventories.

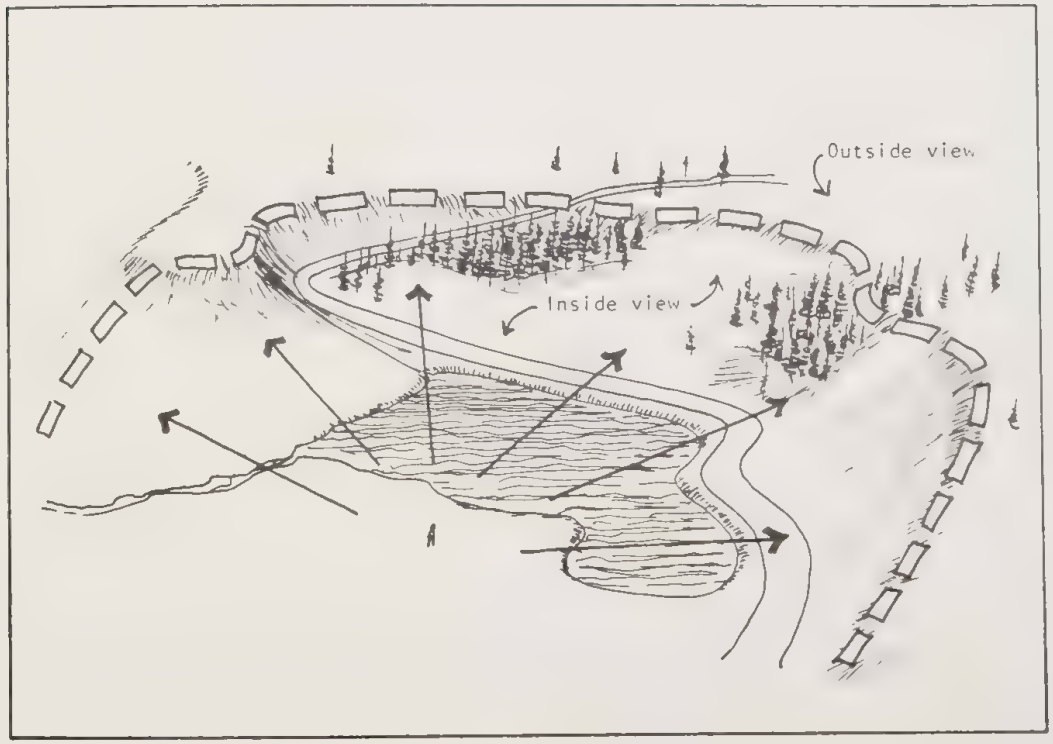


Figure 9: A Viewshed

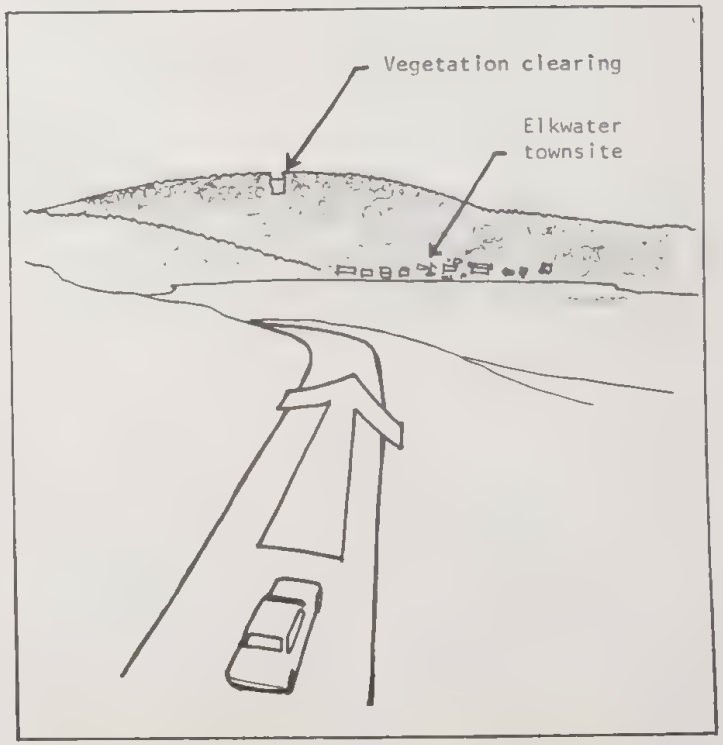


Figure 10: Axial Focus on Negative Elements at the Main Park Entry Experience on Highway 48

A further refinement on the visibility aspect is involved in the visual penetration concept. This takes into account the influences of vegetation species, height and density. Only trees and very large shrubs are considered since lower vegetation would not block vision appreciably (very tall dense grass does not occur at Cypress Hills).

The effects of visual penetration are illustrated below. First of all, the generalized relationship to forest height and density is shown in Figure 11. This was incorporated as a consideration for impact and attractiveness in the computer analysis. Figure 12 and Photos 26 to 31 illustrate the effect of tree species and maturity on visual penetration.

Forest Height		0	Less Than 30 feet	30 Feet and Greater
Forest Density	None	very high		
	Sparse		high	high
	Moderate		moderate	moderate
	Dense		low	moderate
	Very dense		very low	low

Figure 11. Generalized Visual Penetration Matrix

An additional factor critical in determining management considerations is that of observers position within the viewshed. This position can be "observer superior", observer normal, or observer inferior (Figure 13). In observer superior, the observer is looking down upon the landscape, as at a vista point such as at Murray Hill or the Reesor Lake overlook. Very little can be hidden from such an observer. Observer normal is a situation in which the observer is at about the same level as the landscape, as on the bench (away from the edge). The distance viewed tends to diminish in this position. Finally, in observer inferior the observer is looking up at the landscape. Elements towering over the observer and viewed at an appropriate distance tend to command much attention, but the ability of the observer to notice unsightly or inappropriate elements may be decreased because the effects of perspective and of vegetation in the view area if it is forest zone.

Systems and Features (Map 18)

The above mentioned components of perceptual zones give these zones their general identity. Organizational elements give them their structure and internal variations and are essential to the formation of the mental maps of the observers. Among the most significant of these elements are those described by Kevin Lynch, including the following:

* Pathways or circulation routes
* Edges
* Transition zones
* Axis
* Nodes or intersections
* Focal points
* Landmarks or visual features

Photo 23. Elkwater townsite streetscape.

Photo 24. Elkwater townsite user service facilities.

Photo 25. Elkwater Lake water sports activity area.

Photo 26. Young, dense aspen at Murray Hill Road.

Photo 27. Mature mixed wood forest of moderate density in Ross Creek zone.

Photo 28. Young lodgepole pine stand of low density on The Bench.

Photo 29. Young, dense "doghair" stand of lodgepole pine, Willow Creek zone.

Photo 30. Mature, dense lodgepole pine stand on slopes of the Elkwater zone.

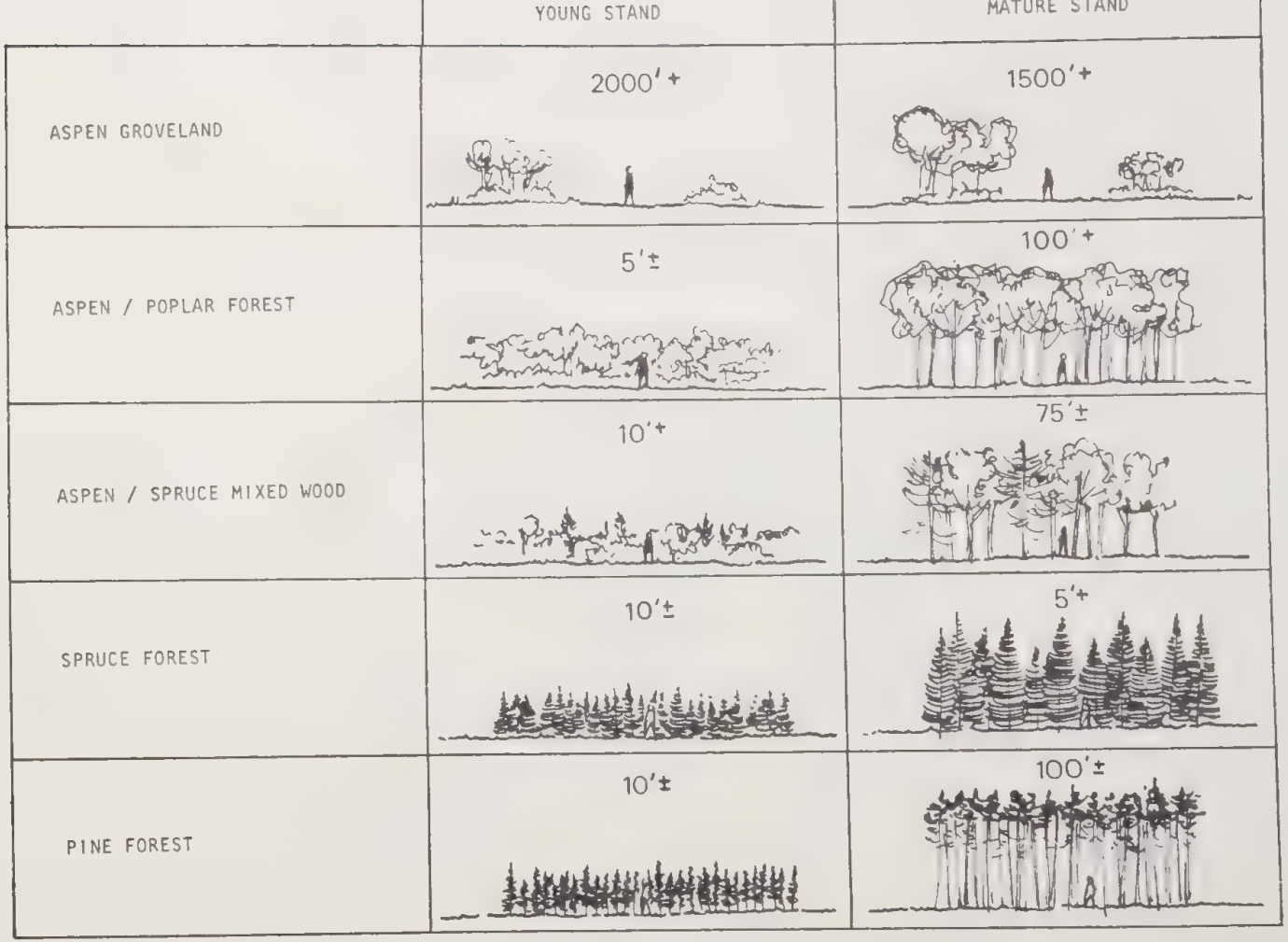


Figure 12: Effect of Tree Species and Maturity on Visual Penetration

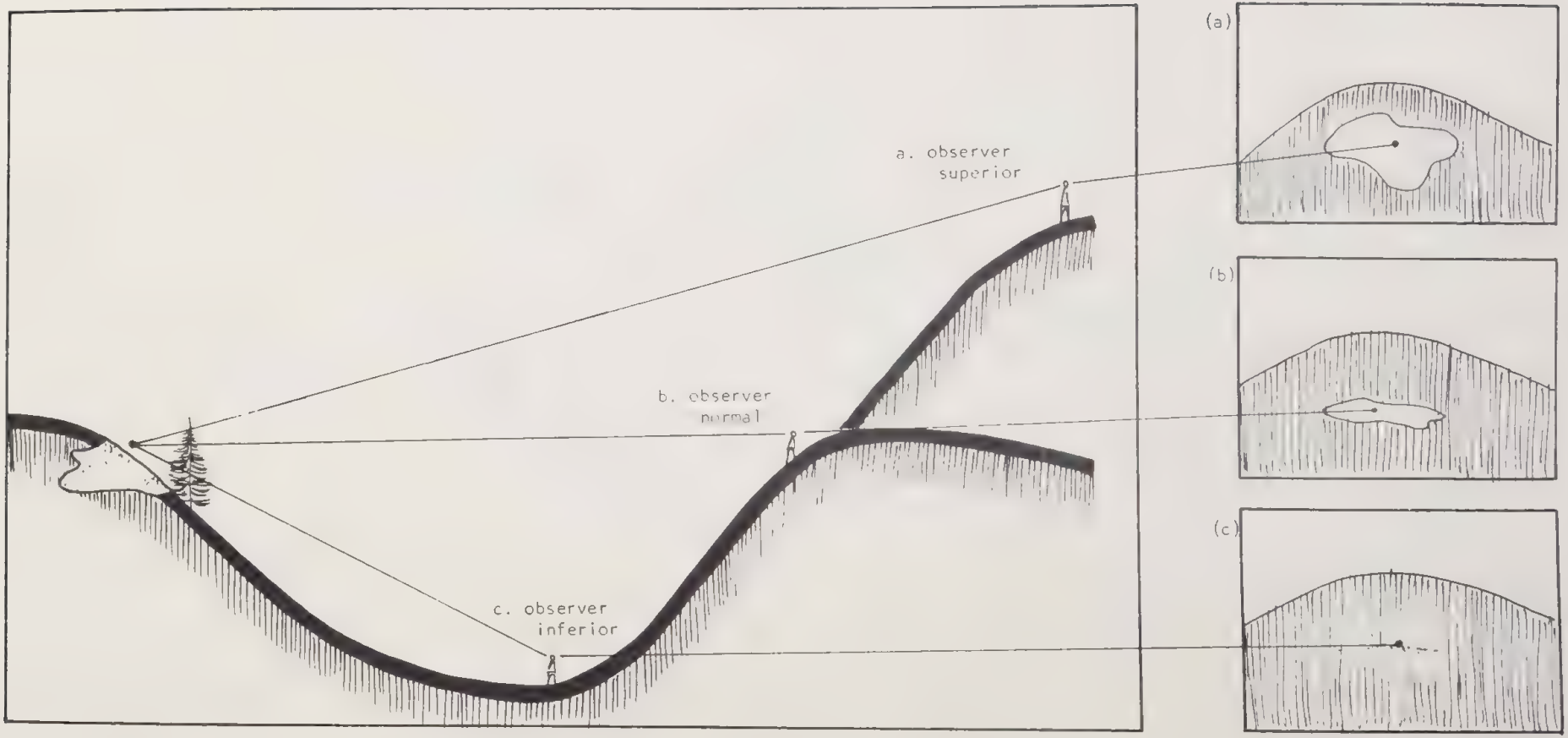


Figure 13: Effect of Observer Position on Landscape Visibility
(From National Forest Landscape Management, Vol. 1,U.S.Forest Service)

LEGEND

- Systems Nodes
- Major features & Landmarks
- Local features & Landmarks
- Cultural
- Natural
- Orientation / Vista points
- Eyesores
- Edge of bench
- Edge of forest / prairie

VISUAL SYSTEMS & FEATURES

18

CYPRESS HILLS PROVINCIAL PARK
Alberta

RESOURCE INVENTORY ANALYSIS AND CONCEPTUAL PLANNING

Lombard North Group

MARSHALL MACKLIN MONAGHAN LTD

To these might be added elements which establish scale and observer position such as:

* Vista points

* Landforms or patterns of vegetation or of cultural elements which generate foreground/middleground/background relationships

Some aspects of structural landscape analysis must be considered in a temporal context. This is the case with motion, change, sequence, and rhythm.

Perceptual Zones of the Cypress Hills

The composite perceptual zones incorporating the above elements are illustrated in Map 19. It may be noted that these zones are strikingly similar to the watersheds. This is due to the relationship of the lines of sight in the viewsheds with the lines of flow of the surface runoff. These all tend to collect in the same central foci of the lakes, reservoirs, and creek beds.

The general format of this inventory will be as follows, except where similarities between zones would render repetition of information redundant.

Zone Name

- Landscape Type
- Landscape Character
- Landscape Visibility
- Systems and Features
- Image

1) Jackpot Road

Landscape Type

The road itself follows a generally level alignment, but most of the terrain around it is sharply rolling, though not especially high, hilly country. Vegetation is grassland/shrubland and mixed grassland with some areas of aspen groveland along the southern perifery, especially in the western portion. (Photos 32, 33, 34 and Vegetation Section Photo 9).

Landscape Character

This is largely a panoramic landscape focusing on the views available of the Cypress Hills to the south.

Landscape Visibility

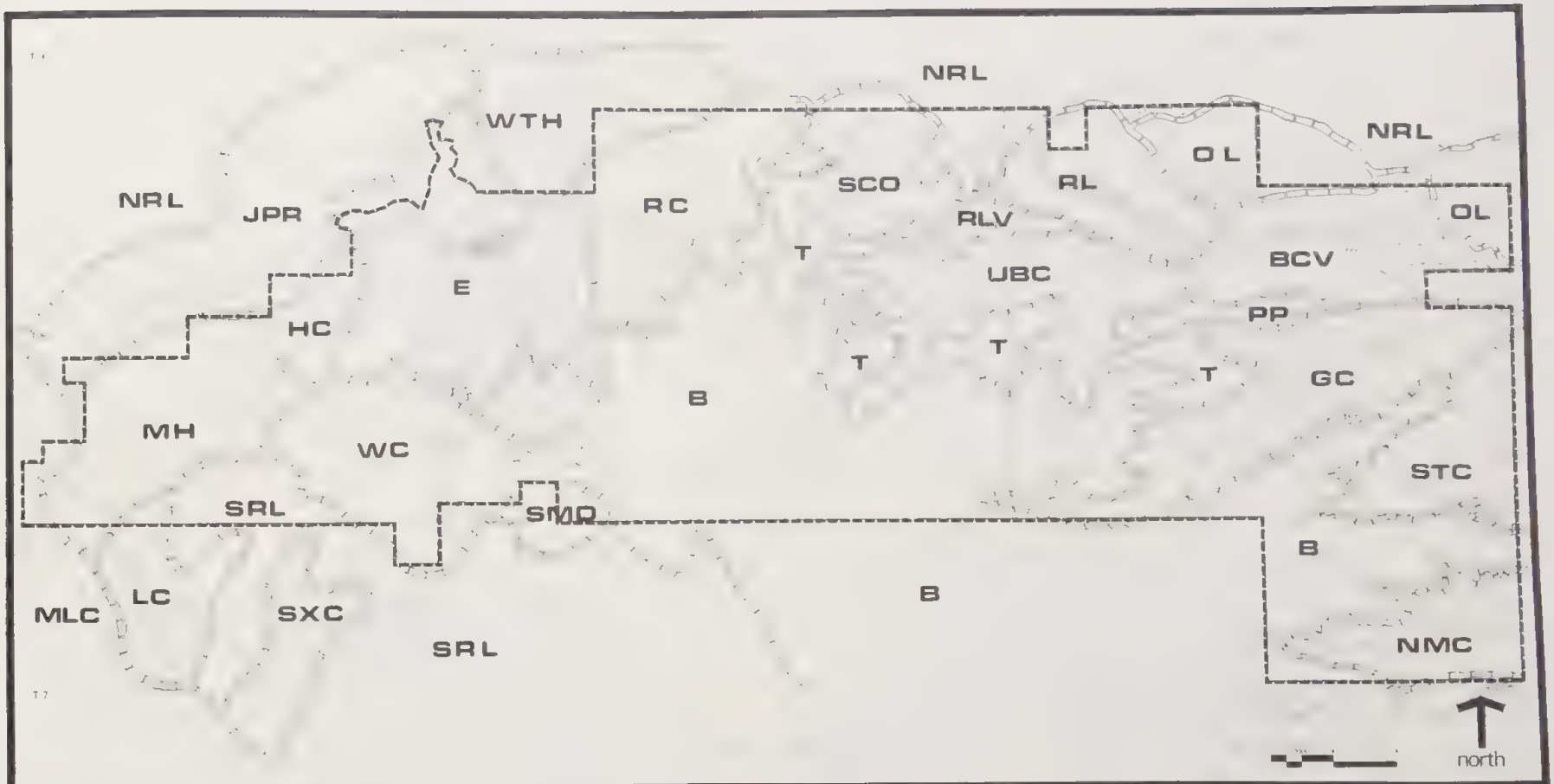
A fairly high level of visibility is the rule in this zone though this is sometimes restricted by minor hills and clumps of aspen. The relevant viewshed is that of the road itself.

Systems and Features

The zone is a linear one running along the base of the slopes at the northwestern end of the Cypress Hills. It is quite clear-cut in organization, being structured around the more or less parallel elements of the edge of the forested hills and the road. Besides the nearly continuous view of the hills, sightings of deer are also a common feature. The route followed by the road affords an interesting sequencial experience as it changes in orientation, focus and sense of enclosure.

Image

The zone is essentially one of pastoral ranchland with no major visual conflicts. The older ranch structures (Photo 34) seem to blend better with the landscape than the newer ones, however.



LEGEND

B	JPR	NRL	RLV	SXC
BCV	LC	OL	SCO	T
E	MH	PP	SMD	UBC
GC	MLC	RC	SRL	WC
HC	NMC	RL	STC	WTH

PERCEPTUAL ZONES

19

CYPRESS HILLS PROVINCIAL PARK

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RESOURCE INVENTORY ANALYSIS AND CONCEPTUAL PLANNING

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Photo 31. Mature, dense spruce stand in a transition zone above Graburn Creek.

Photo 32. Jackpot Road zone looking toward Medicine Lodge Coulee.

Photo 33. Murray Hill zone seen from Jackpot Road.

Photo 34. Old ranch structures in the Jackpot Road zone with a view of the Cypress Hills in the background.

2) Murray Hill

Landscape Type

Though the forested northern slopes constitute the principal landscape type, this zone is distinguished by a great variety of slope conditions and vegetation types including all varieties of flat, gradually sloping, and steeply sloping pine, spruce and mixed wood forests and aspen groveland along with fescue grassland, mixed grassland, and some small pockets of shrubland. (Photos 26, 33, and 35).

Landscape Character

Panoramic is the dominant classification here although, again, a great deal of variety is the keynote with areas occurring of Enclosed, Feature, Canopied and Detailed landscapes.

Landscape Visibility

Due to the nature of the zone,visibility also varies. From the vista points of the small patch of plateau atop the zone, the observer may take in a viewshed that incorporates a distance of many miles to the north and west.

The viewsheds within the dense coniferous forests of the slopes, however, are only one hundred feet across, or so.

Systems and Features

The zone is structured around the subzone of the area of elevated plateau which contains the vista points and forms the primary internal focus of the zone (the primary absolute focus being the view which is extinsic to the zones).

Roads radiate out from this area, the principal ones being the Murray Hill Road down to the western park entry and the extension of the main park road. The Murray Hill Road, although lacking in desirable engineering characteristics offers one of the highest value sequential experiences of the park. (Figures 14a - d).

The outstanding features are the vista points of the high plateau, some of which are further enhanced by enframement from adjacent stands of mature pine.

Image

This is a first-rate natural zone with no conflicts.

3) Horseshoe Canyon

Landscape Type

A steeply-sloping continuation of the northern slopes of Murray Hill curving around a horseshoe-shaped depression. These slopes are covered with aspen, mixed wood and pine forest.

Along the top of the zone (the southern edge) there is a small narrow portion of the fescue grassland plateau, beginning with the east-west park road coming out to the Horseshoe Canyon overlook and continuing along the scenic road heading down into the Elkwater Zone. (Geology Section, Photo 5.)

Landscape Character

This is a panoramic zone continuing the Murray Hill vista of over Jackpot Road and beyond.

Landscape Visibility

The elevated plateau portion is highly transparent and has a great deal of attention focused on it besides. The forested slopes, by contrast, are very opaque.

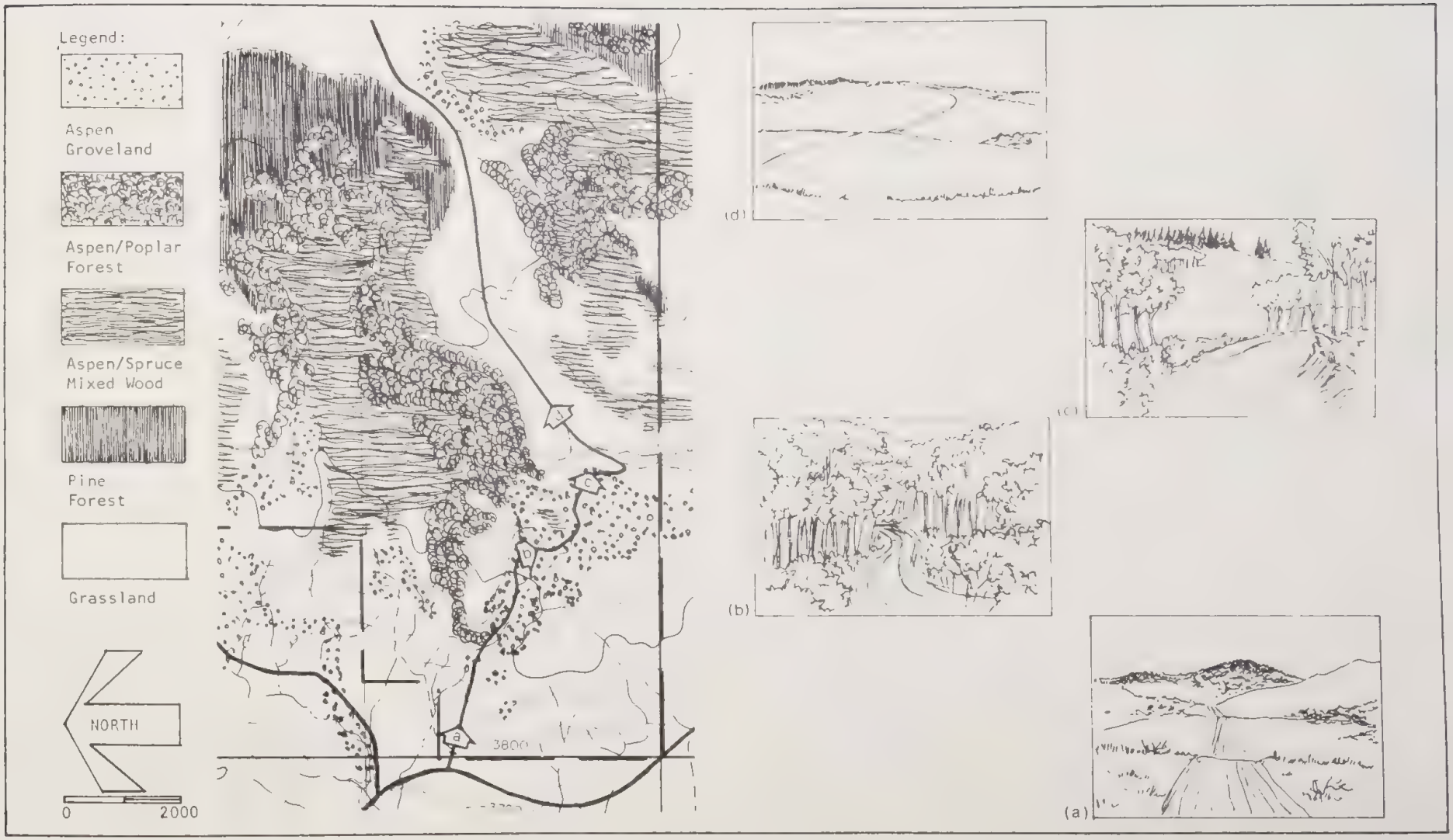


Figure 14: A Sequential Experience on the Murray Hill Road

Systems and Features

The top and bottom of the slopes, corresponding to the edges of the forest are clear cut boundaries to the zone. The other limits are somewhat less distinct being the edge of the viewshed on the west and the ridge line, and then the edge of the viewshed on the east.

Access is around only the upper edge of this zone at present with views into it or across it.

Features consist of the Horseshoe Canyon vista point and the upper portion of the scenic road down to Elkwater.

Image

This is an excellent natural zone with no conflict.

4) Lodge Creek and Sexton Creek

Landscape Type

These are both draws with aspen forest following their sloping walls.

Landscape Character

The predominant feeling is that of the Enclosed landscape.

Landscape Visibility

There is a fairly high level of landscape visibility within these compact, well-defined viewsheds. Observer superior positions are common.

Systems and Features

The zones are straight-forward in organization with their essentially linear configuration, clearly-defined edges, and farm access roads travelling up them. No outstanding features occur although some good views may be had from the higher points along their upper rims.

Image

These zones are a blend of natural and pastoral, a combination of open ranchland, woodlots and ranch yards.

5) Medicine Lodge Coulee

Landscape Type

The floor of the coulee is a vast flat plain while the walls are steeply sloping. Vegetation is predominantly short grass prairie (Photo 36).

Landscape Character

The coulee is a striking visual experience, being a sharply-defined Enclosed landscape on a grand scale.

Landscape Visibility

The zone is highly transparent due to the absense of screening vegetation or topographic variation between the "walls" which define the viewshed.

Systems and Features

The coulee is a clear linear statement with well defined edges. The road to Medicine Hat reinforces this structure, but the numerous nodes which occur along it, including the important Jackpot

Road intersection, are somewhat nebulous and easily confused. Many ranch roads branch off from it to terminate in dead ends.

The significant features within the zone are the interesting rock outcroppings along the northeastern wall and some time-worn ranch structures.

Perhaps the most significant aspect of the zone, however, is the potential it contains for a comprehensive "cross sectional view of the Cypress Hills". Moving along Hwy. 941 from north to south past the park, the land can be viewed as it builds up to the forested slopes, the high point of Murray Hill, then changes to grassy plateau penetrated by the forested fringes of the Lodge Creek and Sexton Creek draws, and finally tapers off to the increasingly flat short grass prairie of the Southern Ranch lands.

Image

The zone is spacious, somewhat wild-looking ranch land.

6) Willow Creek

Landscape Type

The zone contains two principal landscape types, the narrow portion of plateau covered with pine forest, except for a generous clearing for the roadway, that wraps around the northern and western portions of the zone and the sloping pine forest that makes up the bulk of the zone. Most of this pine forest is of the "doghair" stand variety: a dense young stand that developed in the area following a forest fire (Photo 29). Although low in variety, the interest of this stand can be increased through interpretation, as is alraady being done.

Landscape Character

Due to the confined feeling created within this zone, it must be classified as a Detail landscape. Attention is focused upon the immediate foreground.

Landscape Visibillty

Visibility is extremely low within this zone. Furthermore, there are no opportunities for observer superior positions outside of the zone. As a result, almost any management activities may be carried on with relative impunity.

Systems and Features

This zone suffers from a lack of organizational elements. The roads within it give it its only sense of structure. It does contain two important nodes: the intersections on the east-west park road for the roads heading for Horseshoe Canyon and Elkwater.

Image

The zone has a basically natural, though somewhat taudry image due to the appearance of the doghair pine stand.

7) Sawmill Draw

Landscape Type

Though on the perifery of the Willow Creek zone, this area represents a striking depature from it. Aspen and mixed wood forests along with small areas of shrubland and grassland generate a great deal of interest in the sloping land of this small draw. (Photos 37 and 46.)

Landscape Character

Panoramic, Detail, and Canopy landscapes may be found in this zone. The panorama orients out across the Southern Ranch lands zone to the distant Sweet Grass Hills. The intriguing details of the old cabin, stable, and sawmill serve to bring the observer's eye back to the foreground, however. In addition, the mixed woods of the site are mature enough to creat some canopied effects.

Landscape Visibility

Generally high along the southern and eastern portions of the zone where the grassland and shrubland prevail. The viewshed extends quite a ways to the south because of the observer superior position of people within this zone.

Systems and Features

The zone is bounded on the west by the edge of the "doghair" stand of pine in Willow Creek and on the north and east by the edge of the flat grasslands of the Bench. To the south, the boundary is the edge of the viewshed and is determined as a function of the distance which may be seen.

Image

The zone has a pleasing pastoral image somewhat gone to seed.

8) The Bench

Landscape Type

The zone is the archtype of flat short grass prairie. (Photo 17).

Landscape Character

This zone is both Panoramic and Detail in character. One has the clear vistas available across the prairie and also across the neighbouring zones along the edge of the bench in the distant background and the small details of the wildlife and low vegetation the immediate foreground (Vegetation Section, Photo 10).

Landscape Visibility

The Bench is the most transparent of the zones in terms of views within it. Superior positions occur outside of it viewing into the zone, however. The viewshed is determined primarily by the distance factor.

Systems and Features

The zone is clearly delineated by the drop off of the slopes and is sometimes reinforced by the edge of the forest as well (Map 18). Within the zone, there is little to determine structure other than the roads.

Major features are few and include only the small area of hoodoos and the "Survival Tree", a deformed Lodgepole pine. Minor features abound for the perceptive observer, however. These include wild flowers, examples of different grass species, buffalo wallows, ground squirrels, fungus covered rocks and the like. Cattle can also form a feature.

Image

The feeling here is one of the wide-open spaces of natural prairie or pastoral ranchlands, depending upon the presence or absence of cattle and the evidence of their passing (such as shrubby cinquefoil.)

9) Southern Ranchlands

Landscape Type

This is gently to moderately-sloping short grass prairie. (Photo 38).

Landscape Character

Like The Bench, this zone is both Panoramic and Detail in character, but the Panoramic quality is enhanced by views of the Sweet Grass Hills to the southwest and the Bears Paw Mountains to the southeast.

Landscape Visibility

The zone is highly transparent. Observer superior positions also occur because of the changing elevation.

Systems and Features

The fairly consistant southerly slope (except around draws) gives an overall sense of orientation. The northern boundary is clearly marked by the break of this slope meeting the flat plateau of The Bench, but to the south the zone extends for miles and has no defined edge. Features are the vistas mentioned above and the details described for The Bench.

Image

This zone is a spacious, pastoral ranchland area.

10) Elkwater

Landscape Type

The type is multiple including slopes covered with a wide variety of forests including aspen, spruce, pine, mixed wood and aspen groveland. Small areas of mixed grassland, grassland/shrubland, willow/sedge, and marsh also occur. All slope conditions are present. (Photo 21 and 44, and Geology Section, Photo 1).

Elkwater Lake and Elkwater townsite, the largest areas of open water and man man development, respectively, of the Cypress Hills also occur in this zone.

Landscape Character

The character inevitably varies as well including nearly all possibilities. Panoramas may be had over the lake from the surrounding hills, either of the lake or across to other hills. The intricate interweaving of slopes and vegetation types around the draws generates areas of Enclosed, Canopied, and Detail landscapes. The lake, the prominent hills north of the park entry and west of the townsite and the entire ridge above the townsite form the foci of Feature landscapes. These features, furthermore, become the central elements in a number of Focal landscapes which orient towards them. (Photo 21).

Landscape Visibility

Although much of the zone is in dense forest cover, the relative transparancy of it due to the topographic conditions may be seen by the high degree of visibility of the powerline cut over the townsite and the numberous cottages, the water tower and so on that clutter the centre of the zone. The effect of these eyesores is increased because of their occurrance in conjunction with visual features. (Figure 10)

Systems and Features

The edge of the zone is delineated roughly by the edge of the viewshed available from the hills surrounding the lake with the upper edge being the break in topography marking the beginning of the Bench.

Photo 35. Enframement of a view of the Northern Ranch lands from Murray Hill.

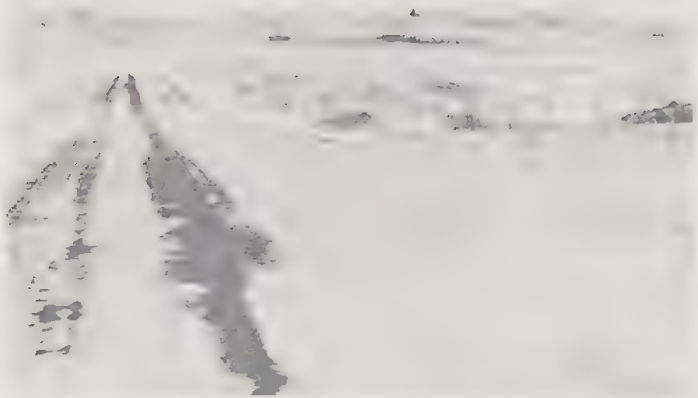


Photo 36. Medicine Lodge Coulee zone.

Photo 37. Sawmill Draw zone with a view to the distant Bearspaw Mountains.

Photo 38. Southern Ranch lands zone.

The orientation of the slopes and views of the zone and the circulation routes within it generally revolve around the lake and the adjacent townsite. One heads up away from it or down to it. Many nodes of major and minor significance occur within it, but without any particular logic. Activity areas likewise abound and often conflict. These include the service area (Photo 24) and residential areas (Photo 22 and 23) of townsite and the adjacent water recreation area on the lake (Photo 25) as well as the large park administration and highway maintenance yards in the woods nearby. Along the road south of the lake to the west may be found numerous picnic sites as well as more cottages. Up the road towards Willow Creek are a number of crowded, cluttered campsites, and up Highway 48 to the south, the ski area and nearby toboggan run. It can thus be seen that the zone is a confused circus in terms of organization or structure. Territorial needs are often violated due to the crowded and frequently incompatible juxtaposition of activities, structures, and use areas.

Image

The image of this zone which could be that of the idyllic natural environment is instead generally man-disturbed. Most of the development detracts to the point of being an eyesore by the way in which it blatantly ignores natural patterns. A few of the cottages echo natural tones and are tastefully concealed in the forest, but most are gaudy, ram-shackle forms generating an image that is at best an ill-fitted urban and at worst slum-like. The water tower and the powerline right-of-way clearing are likewise unfortunate departures from the natural image, one which may be seen for miles because of their prominent positions on the high ridge forming the feature over the townsite. The situation is worsened since this ridge and the unsightly townsite below it are at the focal termination of Highway 49, the main entry to the park (Photo 21).

In total, then, the varied and attractively natural image of one of the potentially most interesting and attractive zones of the park is grievously compromised by the development occurring within it.

11) White Tail Hills

Landscape Type

The zone contains grass covered hills rising out of a lowland plain where grasslands, marshlands, and aspen groveland occur. (Photo 18).

Landscape Character

The hills create a Feature landscape. Detail can also be found, of course, in the marshland, grassland, and aspen groveland.

Landscape Visibility

The combination of vegetation unsuitable for screening and the elevated topography make the zone highly transparent.

Systems and Features

The zone orients around the features of the hills with no other organizational elements to speak of. White tailed deer sightings form an Ephemeral feature.

Image

The image runs from the pastoral in the flat grassland areas to the wilder natural in the hills and aspen groveland.

12) Ross Creek

Landscape Type

The zone is composed of varied sloping forest including aspen, spruce, pine, mixed wood and aspen groveland. (Photo 27).

Landscape Character

The zone is predominantly composed of Canopied and Detail landscapes of mature forests interspersed with some Enclosed landscapes of the small pocket clearings.

Landscape Visibility

The zone is fairly opaque relative to views within it due to the denseness of the vegetation. Any significant vegetation clearing, however, could become visible from viewpoints outside the zone to the north in the White Tail Hills zone.

Systems and Features

Orientation is somewhat nebulous because of the lack of panoramas or landmarks and the confusing way to draws cut up the topography. The only existing system is a recently-developed hiking trail. Creeks, springs, wild flowers, and ferns comprise the attractive local features. With some interpretation, the archeological site on the Elkwater edge of the zone can provide added interest.

Image

The zone is wholly natural except for some old structures on the western edge.

13) Spruce Coulee

Landscape Type

This zone, like most along the northern most edge of the Cypress Hills consists of highly varied vegetation types on steeply sloping terrain. Pine and mixed wood predominate, with aspen, aspen groveland, and grassland/shrubland also being found. (photo 39).

Landscape Character

The Spruce Coulee reservoir forms the central focus for a Feature landscape. On the periferies of the zone, there are continuations of the Canopied, Detail, and Enclosed landscapes of the Ross Creek zone.

Landscape Visibility

This is very high in the cleared area along the eastern side of the reservoir but fairly low elsewhere due to the density of the vegetation.

Systems and Features

The topography, views, and access road all orient around the reservoir which is also the zone's only Feature of landmark status.

Image

The natural environment of the forest and the wildlife associated with the reservoir and marsh give the zone its dominant image (Wildlife Section, Photo 14). A less desirable man-disturbed image is found in the embankment dam, a harsh, unlandscaped departure from the natural scene (Photo 39), and the crowded campsite nearby where degradation of the natural environment is apparant.

14) Reesor Lake

Landscape Type

The zone has primarily steeply-sloping terrain covered with one of the greatest varieties of vegetation to be found in the park. Included are pine, spruce, aspen, aspen groveland, and mixed wood forests along with fescue and mixed grasslands, shrubland, and willow/sedge communities.

Some areas of flat grassland occur around the northern and eastern sides of the lake. (Photo 43).

Landscape Character

The zone is a Feature landscape orienting to Reesor Lake

Landscape Visibility

This is generally high. The open nature of the landscape north of the lake allows for little screening, and even on the southern side the steeply-sloping terrain would quickly reveal any development requiring vegetation clearing.

Systems and Features

The structure is straight forward. Topography and views focus on the lake. The road also descends to the lake then follows along its northern edge. It's unfortunate, however, that the road must follow this landmark feature so closely for such a distance.

Image

The image of the zone is primarily natural, but somewhat compromised. In addition to the above mentioned road, a clutter of picnic tables, parked cars of fishermen, stockpiled soil, and a rectalinear fishing dock of a glaringly urban flavour have come to be associated with it. (Photo 40).

At the western end of the lake, cattle have conducted a concerted assault to create a mudhole. The eastern end of the lake has likewise been degraded by an area of road cuts and an embankment left unlandscaped and raw. (Photos 42 and 43). A brief natural interlude at the creek is followed by the artificial clutter of painted roadside posts, garbage cans, and paving at the campground (Photo 41).

15) Reesor Lake Vista

Landscape Type

This zone consists of a small isolated segment of the flat fescue grasslands of The Bench.

Landscape Character

Definitely a Panoramic zone, this contains of the two most inspiring vistas of the park. One looks out over Reesor Lake and the surrounding hills to the east and the rolling prairies to the north. This vista continues on miles beyond the park boundary. (Geology Section, Photo 6).

Landscape Visibility

As is characteristic of the flat grasslands, this zone is highly transparent.

Systems and Features

With the edges of the plateau and forest, neither of which is far from any point in this zone, with a road bisecting it, and with the organizational potential of the vast overview, this is probably one of the zones in the park in which it is most difficult to get lost. The only feature of any sort actually within the zone, unfortunately is the interpretive sign at the vista point.

Photo 39. Spruce Coulee reservoir with unkempt embankment area.

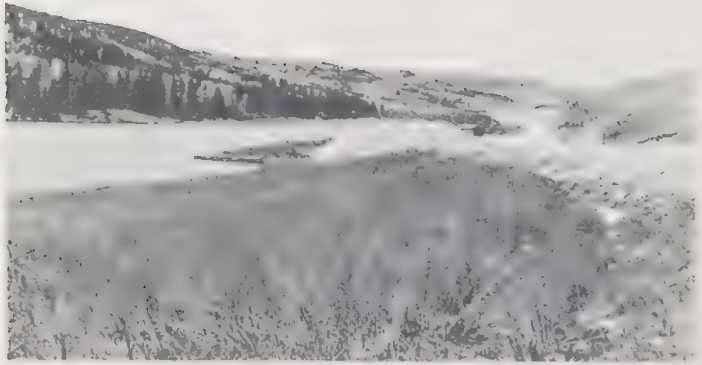


Photo 40. Reesor Lake fishing pier, spoils pile, and road.

Photo 41. Over serviced campground in the Reesor Lake zone.

Photo 42. Reesor Lake, the natural image.

Photo 43. Reesor Lake, the man-disturbed image.

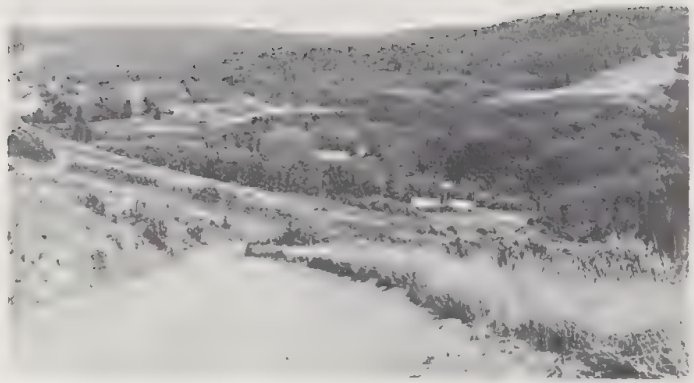


Photo 44. Disorganized man made intrusions in the natural scene of the Elkwater Lake zone.

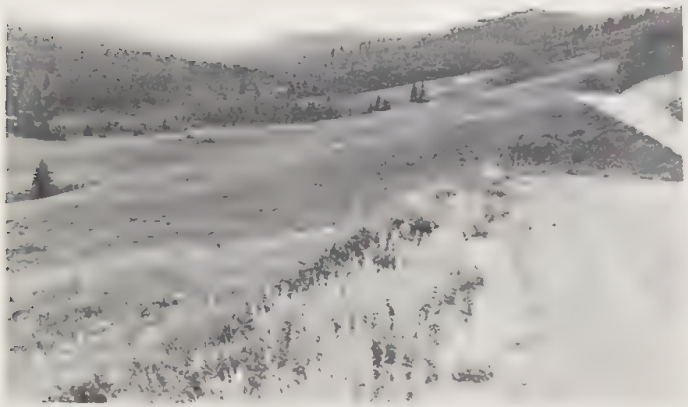


Photo 45. The Battle Creek Valley zone, foreground - middle-ground, and the Upper Battle Creek zone, background.

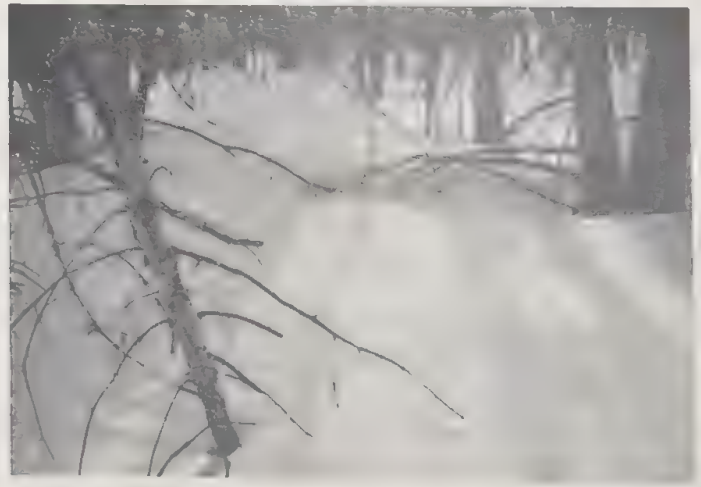


Photo 46. Sawmill Draw zone.

Image

This sign, an artificial element in an otherwise natural landscape, is placed between the observers and the view. To add to the insult, the sign contains a painting of the natural view immediately behind it. (Wildlife Section, Photo 11).

16) Battle Creek Valley

Landscape Type

Slopes consist predominantly of a steeply-sloping escarpment along the southern edge of the creek valley and a ridge of moderate to steeply-sloping hills along the northern edge. All of the former is forested in spruce-aspen, mixed wood with some pine along the upper edge of the escarpment. Most of the latter is mixed grassland or grassland/shrubland with a large area of aspen groveland on the western end of the valley. There is also a narrow, mostly flat valley bottom covered in grassland with isolated clumps of mixed wood and shrubland. (Photo 45 and Vegetation Section, Photo 7).

Landscape Character

The landscape is a blend of the Panoramic, the Enclosed, and the Focal. Panoramas incorporating elements a couple of miles distant may be had along the Battle Creek Road. The strongly axial quality of the valley and the steep enclosing valley walls create a tough focused at the forested hills on the west and east ends.

Landscape Visibility

Nearly the entire landscape may be taken in at a glance from most points on the northern slopes, on the valley floor, or from the ridge on top of the southern slopes. The dense forests of the latter slopes offer some screening although the steepness of these slopes nullifies this effect at any clearing. The entire zone may thus be considered a single viewshed and one in which there is little potential for concealment of management activities.

Systems and Features

The Battle Creek Road and Battle Creek itself are the principal organizational elements of the zone, along with the aforementioned axial quality of the zone itself. Although the creek meanders a great deal within its channel, it may be observed to have a strongly defined general direction. The creek forms a visual feature of some interest. The other most outstanding feature, or landmark, is the slump area on the southern escarpment. This feature requires some interpretation in order for the observers to appreciate it since it may otherwise be taken as an example of the heavy hand of man and thus acquire a negative aspect (Geology Section, Photo 3). The Reesor dwelling south of the creek on the eastern portion of the zone stands out to a remarkable degree being the only non-natural element, aside from the road, of the zone.

Image

The zone has a highly attractive natural image, the only variances being the road and the Reesor residence.

17) Outliers

Landscape Type

The northern side of the zone consists of generally flat to gently-sloping grassland rising to the steeply-sloping aspen and aspen groveland-covered area building up to the actual outliers (small isolated portions of The Bench) overlooking Battle Creek Valley and Reesor Lake. (Geology Section, Photo 6).

Landscape Character

This zone is primarily Panoramic although the outliers also tends to generate Feature landscapes.

Landscape Visibility

The zone is highly transparent especially with the potential for observers superior positions from the outlier.

Systems and Features

The outlier and the north-south road running to the east of it are the only organizational elements, the former also being the only feature.

Image

The image is largely natural in the sloping portions blending into the pastoral in the flat areas.

18) Graburn Creek

Landscape Type

This zone is a steeply-sloping trough with only an extremely narrow, relatively flat creek bed in its eastern end. Nearly all of the sloping creek valley walls are covered with lodgepole pine with a band of mixed woods following along the bottom of the trough near the creek. (Photo 19, Geology Section, Photo 49.)

Landscape Character

The dense forests give this zone a Detail and Canopied character since long vistas are rare. The creek itself forms small Focal landscapes at points where access is possible.

Landscape Visibility

As mentioned above, the dense pine forests limit visibility. Management activities and park usage can be well concealed unless located immediately adjacent to the circulation systems or focal points such as accessible portions of the creek.

Systems and Features

Again, due to the dense, forest the Graburn Creek Road and the Police Point Road which traverses the northern-most edge of the zone offer the only strong organizational elements for the observer. The lack of clear views of the edge of the escarpment or other strong Features makes orientation difficult. Trails developed in this zone would have to be well marked.

Image

Except for the road and the cattle thrashing through the underbrush and mucking up the creek and its banks, the image of this zone is wholly one of attractive, natural, forested hills.

19) Upper Battle Creek

This zone is very similar to Graburn Creek, and all of the same remarks apply. Orientation within this zone, however, is even more of a challenge due to the lack of any roads as passable as those of Graburn Creek. (Photo 45).

20) Police Point

Landscape Type

This zone is basically an portion of the Bench isolated by forest, though on a smaller scale.

Landscape Character

Its most significant character is that of the Panoramic due to the vistas along its northern edge which looks out over Battle Creek Valley.

Landscape Visibility

Highly transparent like The Bench.

Systems and Features

The edge of the plateau forms both the dominant feature and one of the organizational elements,the others being the Police Point Road which crosses through the middle of the zone. The slump area is another feature that may be viewed from this zone, though at the observers peril. An abstract interpretive feature in the form of the Ft. MacLeod Trail is also located in this zone.

Image

The image is a natural/pastoral one similar to The Bench.

21) Storm Creek

This is another zone similar to Graburn Creek though with less mixed woods and more spruce. There also is no appreciable evidence of the influence of man.

22) Nine Mile Creek

This zone is similar to the above, though with more mixed vegetation types including areas of mixed grasslands and aspen groveland. Consequently, greater potentials for views and vistas occur.

THE PHYSICAL ANALYSIS

Considerations relating to visual resources have entered into the general computerized analysis process with the other portions of the study. However, there are certain critical aspects of these resources that do not lend themselves to such an approach and which have therefore been called out for independent analysis. These aspects are discussed here and then relayed directly into the conceptual planning process.

Overview Evaluation

In reviewing the visual resources of the park, positive and negative aspects emerge with respect to certain elements. For the most part, these can be thought of as having a bearing on the perceptual universals described previously.

Coherence

Although the natural structure of the Cypress Hills is simple, dynamic, and clear, it has been ignored and obscurred by the man-made development imposed upon the area. Roads are everywhere, trails head out into the unknown and end in awkward locations, no clear structural breakdown of the area into sub areas or zones occurs, there is little or no indication of the

image, function or recreational potential of the different portions of the Cypress Hills. At the townsite, caos prevails; clutter consisting of ramshackle and/or gaudy cottages, propane tanks, backhouses, utility poles, junk, automobiles, trailers, and the like crowds around the lake and runs up the hillsides.

Structures and other projects in the park have an ad hoc appearance and seem to be dropped onto their sites as if conceived in a void. The fishing pier at Reesor Lake is a example. It has a mass-produced, urban flavour that bears no relation to the natural area around it to the point of almost appearing to be a mirage.

In the campgrounds, paved pads, gaudily-painted roadside posts, and columns of garbage cans march across the landscape following their own abstract dictates of form and direction, not nature's.

The park entry experience is also confused. There are at least 17 possible entry points. Of these the principle one, along Highway 48 from the north, focuses on the least desirable portion of the park, the Elkwater townsite and the power line clearing above it (Figure 10). Passing a nebulous turnoff for Elkwater townsite, the highway sweeps across a marsh and then proceeds to slash its way up a forested coulee, leaving naked unvegetated cuts in its path. It continues on across the park as if the park weren't there and continues relentlessly on to the U.S. border.

Perceptual Stimulation

The natural environment of the park is very high in both the quantity and the quality of the perceptual stimulation available to the park user. The entire site of the forested hills forms a pleasing variation to the flat-to-gently-rolling short grass prairie of the region. Within the hills, a great variety of vegetation (Map 10), slope conditions (Map 3), and combinations thereof may be found.

Even The Bench, which in and of itself might seem a case of low interest to the point of sensory deprivation has its place in the overall context of the park. It exemplifies a regionally important landscape type and sharpens the visual contrast with the forested slopes.

The problem in the park is that the quality of the natural environment cannot be fully appreciated. One reason for this is a lack of interpretation which will be covered below. Also, the modes of access to the visual resources are restrictive to their appreciation. There is a dearth of pedestrian trails and a predonderance of roads in the park, and the motorist is less able to notice the finer aspects of the varying scene than the pedestrian would be.

Futhermore, interesting sequential experiences along the roads are rare. The Murray Hill Road (Figure 14a - d) is the exception rather than the rule. Most of the park roads are straight, unimaginatively-sited, boring experiences.

Elkwater townsite, of course, represents a striking departure from the type of stimulation that is appropriate to a natural park environment.

Shelter, Freedom and Privacy

These aspects come into play in the creation of a recreational environment in a number of ways. The basic natural environment of the Cypress Hills, again,offers an excellent context for the satisfaction of these needs, but, again, this is not being used in an effective rational manner.

Existing tree and brush cover is not utilized for its ability to screen campgrounds from the road or campsites from one another. Vegetation and topography are all to seldom employed for their potential in isolating inappropriate or conflicting uses such as the residential townsite from the park.

Priorities with respect to freedom seem misdirected as automobiles and cattle have the run of the park while people are herded into crowded, fenced-off campgrounds and restricted to only two hiking trails.

There are many decentralized areas along the sheltering edge of the forest along The Bench which offer both panoramas and privacy, but which are denied to people due to the lack of facilities such as trails, picnic and camp sites. The experiential options available to the recreationalists are thus unnecessarily limited in the park at present.

Territory

In a related manner, the territorial needs of the park users could be easily satisfied in the Cypress Hills, but they are not. Overcrowding in the campgrounds ("crampgrounds" was a Freudian slip that once emerged in a discussion of them) is the primary problem. High densities in these areas generate tensions, and cause subconscious defensive reactions similar to those encountered in large cities and certainly not appropriate to a natural park setting.

Excessive concentrations of recreation, especially in its high-impact forms, can also generate such tensions. This is the case on Elkwater Lake at high tourist season (Photo 25).

Another factor lies in the fact that different individuals have different territorial needs, some requiring more isolation and space than others. This should be acknowledged by the provision of a greater variety of options than currently exists.

General Prerequisites

The following points then emerge as prerequisites to a management scheme which would recognize the true value of the park's visual resources.

1) The natural environment must be acknowledged as the essential visual resouce of the park. Man-made elements should be subordinated to it in terms of visibility and image.

2) The importance of concepts of landscape type, character, and visibility must be recognized, and any construction, clearing, or other management activities must involve a consideration of the ultimate visual impact as a function of these concepts.

3) The essential matrix of systems and features must assume its proper role in clairifying and differentiating the perceptual structure of the park and in enhancing its interest and attractiveness. This would best be accomplished by simplifying the man-made systems (noteably the road network) and harmonizing them with the natural systems, by removing eyesores which degrade adjacent natural features, and by supplying access to, and interpretation of those features which are currently underutilized (where this does not entail undue impact).

4) The perceptual zones of the park should be recognized for their value in characterizing the visual resources and experiential potential of the different areas of the park. Efforts should be made to eliminate visual conflicts from these zones. The zones should then be utilized for their most appropriate interpretive and recreational potentials.

Problem Areas

In summation, then, the following emerge as the principal problem areas in terms of the park's visual resources.

Entry Experience

The existing primary entry experience along Highway 48 coming into the northern side of the park is one of the least attractive possible. This is due to the way that if focuses on the negative elements of the Elkwater townsite and the power line right-of-way (Figure 10). Alternatives should be explored including Jackpot Road, Murray Hill, and the southwestern corner of the park (the Lodge Creek-Sexton Creek area).

Of the several other existing and potential entries to the park, many would have a higher potential in terms of a visual experience that acknowledges the true resources of the park rather than focusing on examples of their corruption and neglect.

Elkwater Townsite

The townsite is a visual disaster area requiring much work to bring about aesthetic consistancy, reduce clutter, eliminate inappropriate elements, and generally bring the natural image into dominance over the artificial.

Reesor Lake

The fishing pier is a major detraction from the natural quality of the site. Unsightly barren areas have not been landscaped or restored following the construction of roads and the embankment with either natural contours or plant materials. Cattle represent a major source of destruction of the areas visual resources and recreational appeal.

Battle Creek Valley

This is a highly valuable portion of the visual resources of the Cypress Hills that should be preserved and enhanced. The road and the Reesor residence are the prime non-natural elements of an otherwise pristine natural scene. The area is currently unserviced by trails.

Spruce Coulee

The unkempt areas by the embankment and the campground are in need of natural restoration. Otherwise, this zone is a highly attractive visual feature area.

Murray Hill

This zone is underutilized with respect to its potential for inspiring and educational vistas. It is a key area in terms of understanding and appreciating the park. Here again there is an over abundance of roads and a dearth of trails. Another potential problem which should be foreseen lies in the future degradation of the quality of viewsheds which can be seen from the park such as the Jackpot Road zone.

Sawmill Draw

In addition to being a vista point similar in quality to Murray Hill, though somewhat more restricted, this zone also has great potential for historic interest with the features of the old cabin and sawmill structures.

Recommendations

Within the park much could be done to clean up and clarify the man-made systems and features, bringing them more into line with the natural structure and image. The road network could be simplified and modifications introduced to bring it more into harmony with the environment including revegetation of some areas damaged in its construction. The design of all park structures and other elements could be standardized to a unified format which would borrow from natural forms and tones and be subordinate to the natural features. In all development of the resources of the park, care should be exercised that the value of these resources is not compromised in the process.

ASSOCIATIVE VALUES AND USER PERCEPTION

General Considerations

People carry with them to a site a complex of subjective associations, expectations, and preferences. These are significant because of the way that people perceive and react to an item of a landscape is a function of:

1) What they expect to find.

2) What they want to do with or get from what they find.

3) How well they can appreciate what they find.

These expectations and preference profiles vary from one group of people to another and often change for a given individual over the years.

Subjectivity of Perception

Landscape evaluation is highly subjective, with the entire context of the evaluation varying for different cultures or individuals. According to Leo Marx in The Machine in the Garden: Technology and the Pastoral Idea in America, "The Landscape ... becomes the sumbolic repository for values of all kinds - economic, political, aesthetic, religious."

This brings up considerations dealt with by Yi-Fu Tuan and other which are too involved and subtle for an analysis. J. Sonnenfeld describes some of these in fairly concise terms as follows:

> "A landscape may have many meanings, positive or negative: a concrete meaning, suggesting grass to walk on, roads to drive on, water to swim in; a use meaning, suggesting utility for recreation, housing, or watershed; a value or emotional meaning, according to which a landscape is considered esthetically pleasing, invigorating, sublime, or conversely, ugly and depressing; and a symbolic meaning in which the landscape represents more than is seen: nature, freedom, a bygone era, a "new world."

Group Preferences

Furthermore, Robert Sommer explains how preferences are often shared by certain groups of people who share a common environment. These preferences for, or attraction to, certain environments or landscapes are acquired as some combination of learning and instinct.

"Humans become attached to particular areas. During the Second World War, Russians from the Great Steppes were confined in mountain resorts in Switzerland and were most unhappy. Pygmies from the covered primeval forest feel exposed and helpless in a clearing while European settlers feel trapped and depressed under the constant jungle cover. The Saskatchewan prairie dweller begins to feel uncomfortable in the scrub brush zone and distinctly unhappy when he reaches the forests of the Pre-Cambrian Shield."

To a certain extent, therefore, the choice of which types of landscape are to be most valued is a function of the group or culture involved.

Another important area of differences in preferences lies in the variation between those of the "native" and the "non-native" in any given area. These are explained by J. Sonnenfeld as follows:

The Native is generally content with the environment and activities with which he is most familiar. Even if this setting does not provide an optimum satisfaction of his needs he may prefer it to less familiar alternatives. Or he may even not be aware that these alternatives exist.

The Non-native, conversely, has usually experienced alternative spaces, landscapes and uses for environments. "His classification as non-native is testimony to his geographical mobility." He consequently has less reason to be content with inadequate environments he encounters. His mobility and other environmental experiences generate attitudes and preferences which set him aprtt from the more limited native. In fact, "the non-native constitutes a personality type whose environmental preferences may be more attune to those of other non-natives than to those native to his home region". "The non-native is more attracted by that which is different, by the unique character of a region or by whatever character of region it is that makes it important for him."

In general, the preferences that emerge for the landscapes in a given park setting would be quite different for the transient tourists than for the local residents.

The interesting variation on this principle in the Cypress Hills lies in the fact that the landscape of the park site is atypical for the region. For this reason, it is the non-native transient rather than the native local who responds most favourably to the site in the most comprehensive and demanding manner as will be seen below.

Changing Preferences

In addition, preferences may change for individuals, or groups of individuals, within a short time span. These changes occur as a result of education, experience, or propaganda/publicity. Many people have been exhibiting an increasing preference for wilderness - type landscapes entirely devoid of the influence of man. At the same time, however, others are demonstrating a preference for outdoor recreation areas of an increasingly convenience - oriented image.

The unknown is often a source of anxiety, as has been mentioned in the discussion on environmental structuring. The life-long bush resident feels as threatened by the city as the city dwellers confronted with the wilderness. This is the source of some of the popularity of the motorized recreational vehicles: The urbanite feels more reassured to have his familiar internal combustion engine with him in one form or another rather than striking off into the wild on foot or skiis. The need for such crutches can quickly be removed, however, by some positive exposure and good experience without them.

The task of evaluating preferences for certain types of landscapes and recreational spaces is a difficult one at best. Some use may be made of user survey and analysis. To a certain degree, however, it should be accepted that one of the duties of the groups or individuals responsible for maintaining a natural or cultural heritage is to attempt to exert some direction in the management of values. Where the popular values are consistant with the preservation of the heritage they should be encouraged. However, where they are at odds, attempts should be made to alter them.

Park Users and the Cypress Hills

The visual resources of the park are attractive, enjoyable and educational only so far as the park users are ready and able to understand and appreciate them. In addition to the nature of the resources themselves, the needs, tendencies, interests and level of sophistication of the park users must also be taken into account.

Types of Users

As may be seen from the User Demand Section, there are three distinct types of users:

1) Residents of Medicine Hat who use the park as a regional facility for camping, picnicing, swimming, skiing, etc.

2) Cottage owners who use the site for longer stays than is typified by the previous category, though most of them also come from Medicine Hat.

3) Non-local visitors using the park primarily as a stop over point. This last group accounts for about 60 per cent of the park users, though their proportion of the user days is less.

It seems that the first two of these groups have similar ways of perceiving the park. Theirs is largely a functional orientation, seeing the park primarily as a regional recreation area and thinking of it in terms of activity zones. They identify the park as "Elkwater" and consider its central focus to be the townsite. Most members of this group have not fully discovered or utilized the large natural areas of the park, nor are they especially attuned to the potential attractions and activities (hiking, nature observation, and so on) these areas contain.

The third group is more mixed in its knowledge and perceptions. Included in this group are many who also have an Elkwater orientation, especially among the Alberta residents. There are also, however, many transients who are forced into such an orientation by the focus of the main park entry road on the townsite. However, with these non-local park users moreso than with the local residents, there is an interest in the natural environment of the park.

Many of the users of all types do not have a very full understanding of the biological, geological, and historical aspects of the park and are thus missing out on much of its interest and educational value. A more aware and knowledgeable park user should also be more respectful of the natural environment he is perceiving.

For some, there is a lack of knowledge of the physical layout of the park and of the recreational potentials of its various areas. This is a consequence in part, of the currently poorly-developed state of organization of the park, as already mentioned. Even such a simple device as an orientational map near the entrance is lacking.

Other park users have a more profound problem in that they lack knowledge of all natural areas and may even fear these areas as a result. If such people do venture out into the natural areas, it is most likely with the security of civilization's internal

combustion engine in the form of an automobile, trail bike, snowmobile, or outboard motor. The environmental education of these people is vital if the character of the park is to be preserved for all users.

Needs

The needs, then, are to help the local residents extend their perception of the park to include the natural environment, to quickly orient the transient visitors, and to maximize the park experience for all users, taking full advantage of the inherent and associative visual resources of the park.

FACILITIES

ACCESSIBILITY

EXISTING TRANSPORTATION SYSTEMS

CLASSIFIED ROAD SYSTEM

PHYSICAL ROADWAY DEFICIENCIES

PROPOSED EXTERNAL ROAD IMPROVEMENTS

● TRANSPORTATION SYSTEMS

This discussion presents the results of an investigation of the existing and proposed transportation facilities at Cypress Hills Provincial Park, Alberta. Areas of investigation include an inventory of existing internal transportation facilities, development of guidelines for classifying the road system, identification of existing roadway deficiencies, and proposed Highway improvements in the area surrounding the Park.

Field information used as the basis for this paper was collected between May and September, 1973, and further data and field verification were supplied during June, 1973 by Mr. A. Salus, Park Manager.

ACCESSIBILITY

Regional Accessibility

Public access to Cypress Hills Provincial Park is essentially via the Provincial Highway system. The nearest railway facility is the C.N.R. line parallelling Highway 1, over 20 miles to the north of the Park. Although a small airstrip is located within the Park, its function is limited to fire protection. The nearest commercial airstrip is located in Medicine Hat.

The Provincial Highway system provides good access via paved roads (Highway 1 and 48) from Medicine Hat and Calgary to the northwest and from Swift Current and Regina, Saskatchewan to the east. Road access from Lethbridge to the west is provided by a good paved facility (Highway 61) to Manyberries, and then by a gravel-surfaced road to the Park boundary, a distance of about 30 miles. Access from Wildhorse and the Canada-U.S.A. border to the south is provided directly by Highway 48. Presently, this facility is paved only for a distance of eight miles south from the Park boundary. However, the remaining section to the border is scheduled to be paved by the end of 1976.

Primary access to the Park is via Highway 48 from the north. Highway 48 south is used by only a small number of visitors. In addition to the primary highway access, there are a number of minor uncontrolled road access points (Map 20). Although no information is available on their use, indications are that only local ranchers and a few park visitors actually use these roads.

Internal Accessibility

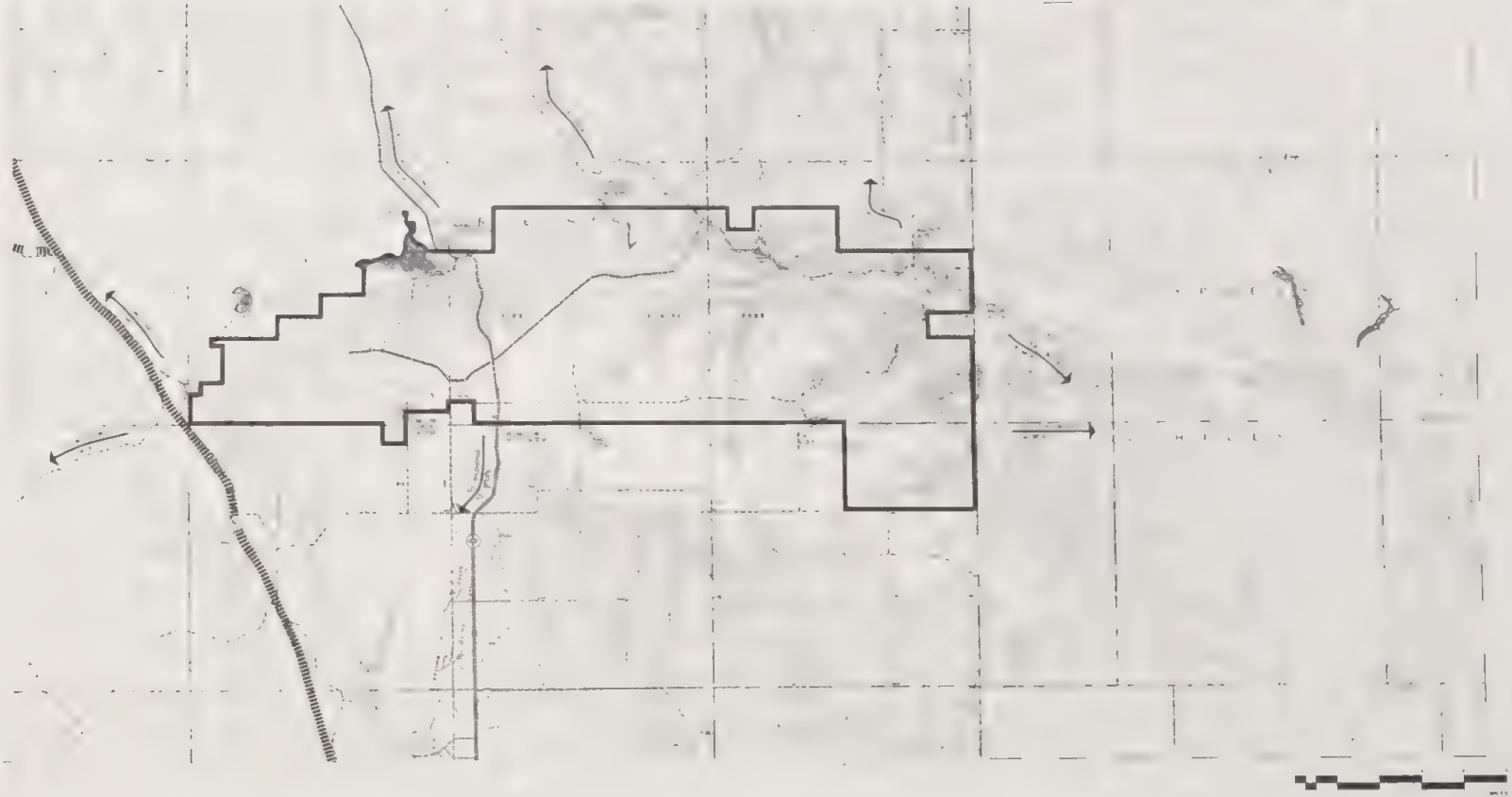
The road system within the Park is well developed and provides a relatively high level of accessibility to most areas. Presently there are 26 miles of hard surface roads, 44 miles of good quality gravel and dry weather roads, and many additional miles of lower standard, dirt roads and trails.

EXISTING TRANSPORTATION SYSTEMS

Road Inventory

All major existing roads within the Park were inventoried by section to determine length, safe operating speed, and surface type. For the purposes of this study, major roads were considered to include (1) all roadways which had been significantly improved from their natural state, and (2) those roads which provide the major access to an area of the Park. As a result, many miles of unimproved dirt roads and trails providing local access within the Park were excluded from the inventory.

The results of the road inventory are shown in Table 17 and on the Park and Elkwater Road Inventory Maps (21 and 22).



LEGEND

PARK SETTING AND ENVIRONS

20

CYPRESS HILLS PROVINCIAL PARK

Alberta

Lombard North Group

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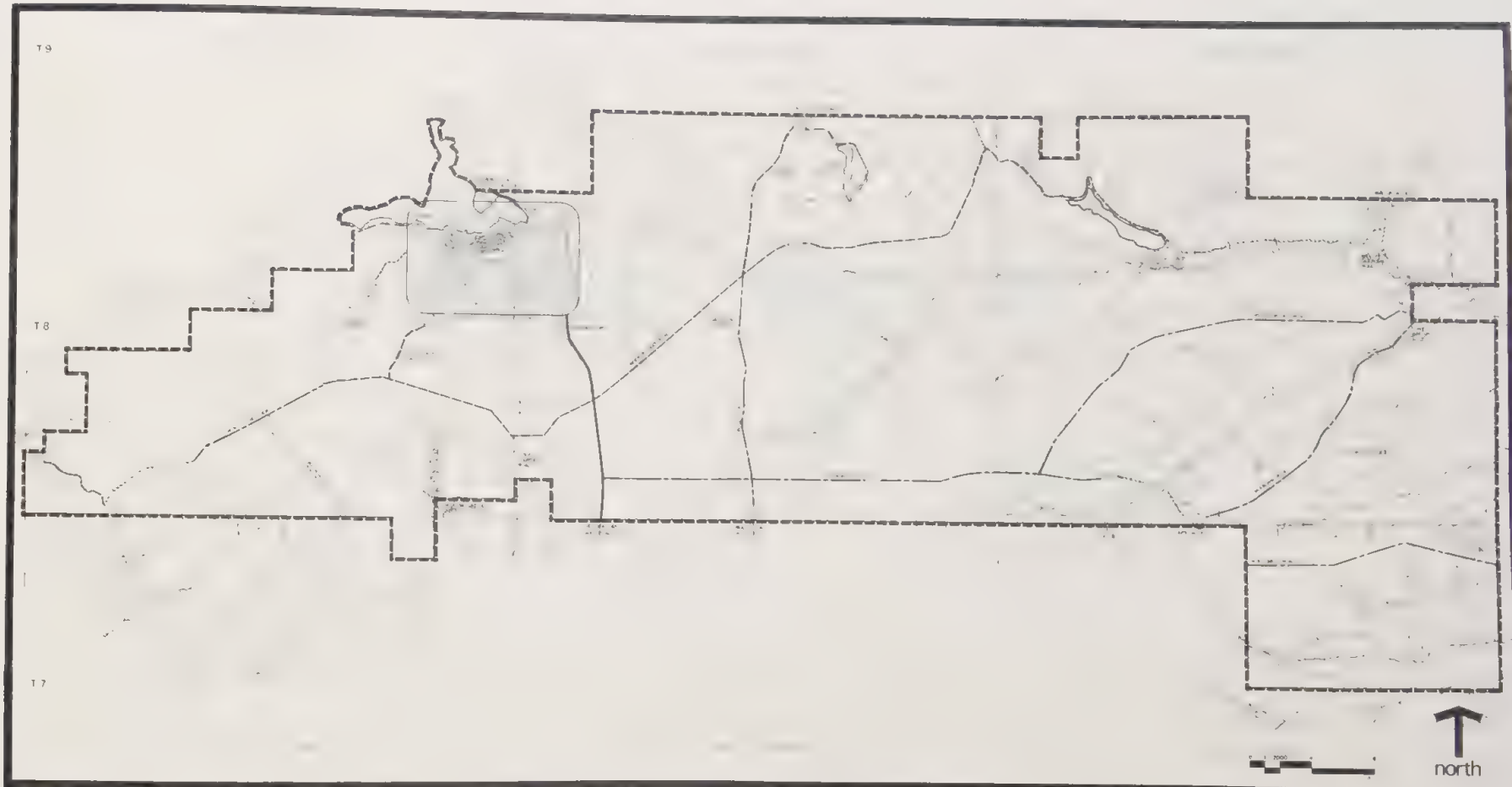


LEGEND

PARK ROAD INVENTORY

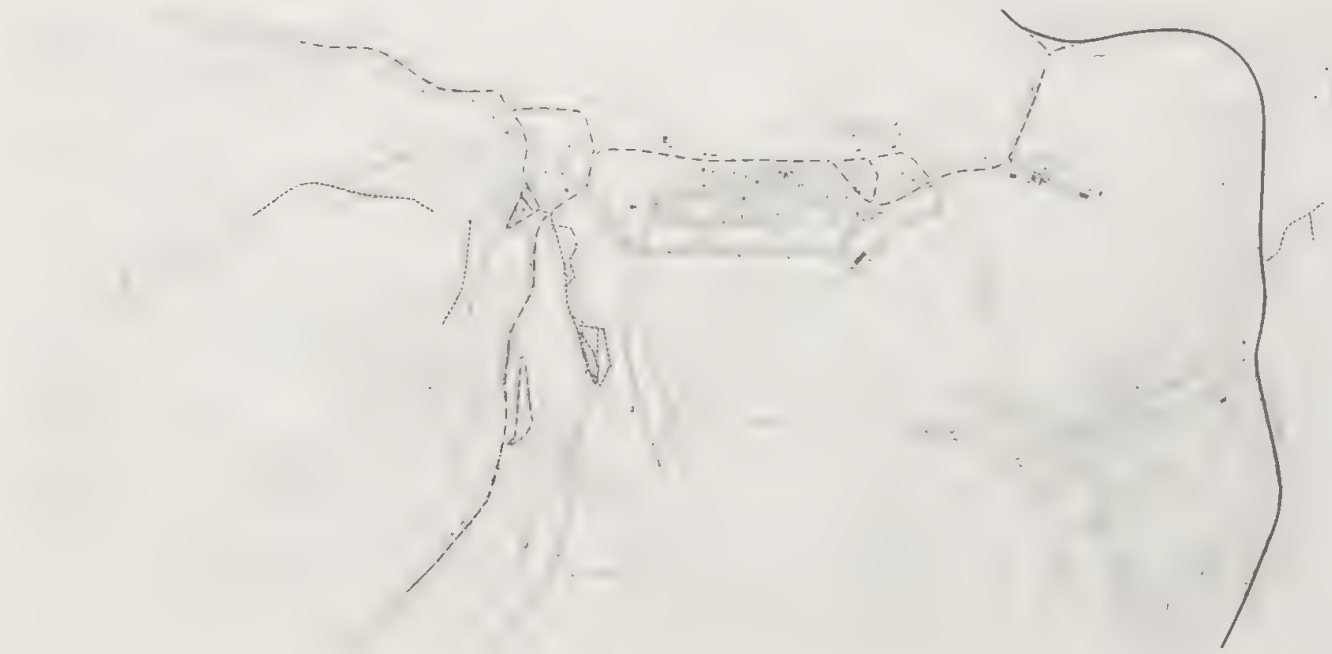
21

CYPRESS HILLS PROVINCIAL PARK

Alberta

Lombard North Group

MARSHALL MACKLIN MONAGHAN LTD



north

LEGEND

ELKWATER ROAD INVENTORY

22

CYPRESS HILLS PROVINCIAL PARK
Alberta

RESOURCE INVENTORY ANALYSIS AND CONCEPTUAL PLANNING

Lombard North Group

MARSHALL MACKLIN MONAGHAN LTD

Table 17

Cypress Hills Road Inventory

PARK / Road	Section	Length (Miles)	INVENTORY Safe Operating Speed(mph)	Surface Type H-Hard Surface G-Gravel on Earth
Murray Hill Road	1-2	1.1	0-15	G
	2-3	1.1	15-30	G
	3-4	1.1	30-50	G
	4-6	0.8	30-50	G
	6-12	0.9	30-50	H
	12-14	1.8	30-50	H
	14-19	1.1	30-50	H
Fire Road	4-5	1.4	15-30	G
Scenic Drive	6-7	1.4	15-30	G
	7-8	0.6	0-15	G
Willow Creek Road	12-13	1.5	15-30	G
Ferguson Hill Road	11-12	0.8	30-50	H
Lakeview Drive	9-10	0.7	15-30	H
Highway 48	16-17	0.4	50	H
	18-19	1.1	50	H
	19-20	1.0	50	H
	20-21	0.6	50	H
Reesor Lake Road	19-24	2.5	30-50	H
	24-28	3.9	30-50	H
	28-30	1.9	30-50	H
	30-31	0.9	0-15	G
	31-33	2.7	15-30	G
	28-29	0.5	0-15	G
Walsh Graburn Road	33-34	0.2	15-30	G
	34-35	0.6	15-30	G
Spruce Coulee Road	24-25	2.1	30-50	H
	25-26	0.8	15-30	H
	26-27	0.5	0-15	G
Bull Trail	22-23	0.3	30-50	G
	23-24	2.5	30-50	G
Reesor Lake Campground - Access Road	31-32	0.6	15-30	G
Graburn Road	20-23	1.9	30-50	G
	23-42	3.6	30-50	G
	42-41	0.8	30-50	G
	41-38	1.7	15-30	G
	38-37	3.6	30-50	G
Police Point Road	36-42	5.5	30-50	G
Nine Mile Road	38-39	0.8	15-30	G
	39-40	3.2	30-45	G
ELKWATER				
Lakeview Drive	10-52	0.5	15-30	H
	52-55	0.2	15-30	H
Ferguson Hill Road	11-53	0.9	30-50	H
	53-54	0.1	15-30	H
	54-55	0.1	15-30	H
4th Avenue	55-56	0.5	15-30	H
	56-57	0.1	15-30	H
	57-59	0.2	15-30	H

Road	Section	Length (Miles)	Safe Operating Speed(mph)	Surface Type H-Hard Surface G-Gravel or Earth
3rd Street	56-58	0.1	15-30	H
6th Avenue	58-59	0.1	15-30	H
	59-60	0.2	15-30	H
	60-61	0.2	30-50	H
	61-62	0.1	15-30	H
	61-63	0.1	15-30	H
Highway 48	17-18	1.9	50	H
Sherwood Crescent	52-51	0.2	15-30	H
	51-53	0.1	15-30	H
Scenic Drive	8-50	0.4	0-15	G
	50-51	0.2	15-30	G
Local Streets		3.4	15-30	G
		0.9	0-15	G
		0.7	0-15	H
TOTAL		69.7		

Parking in Elkwater

There are three types of parking supplied within the Elkwater community: on-street, off-street parking lots, and informal off-street parking associated with some activity areas.

On-street parking is permitted on all streets within Elkwater including 4th Avenue, the main arterial street within the community. The one formal off-street parking lot, located on the southwest corner of 4th Avenue and Centre Street, near the amphitheatre, provides a paved parking area with a capacity of 88 vehicles.

Other parking available to the public is of an informal type located in, or adjacent to, the day-use activity areas.

Airstrip

An airstrip presently used for fire fighting aircraft is located within the Park boundaries.

The airstrip is located about 1,500 feet north of and approximately parallel to Murray Hill Road just west of Highway 48. The airstrip is at an elevation of 4,650 feet and is constructed to a total length of 3,800 feet and 100 feet in width. The surface is composed of compacted clay and gravel which is repacked annually.

A wind sock is installed at the southwest end of the airstrip on the right perimeter of the runway and a frame fuel cache is presently under construction across the runway from the sock. Future plans include installation of aircraft tie downs, the construction of two 1,000 gallon water tanks, and the possible development of a cross-runway if use of the facility increases.

Vehicular Traffic

The Department of Highways and Transport conducted a program of manual intersection counts at major intersections in the area during the last few years. These counts identified traffic volumes, vehicle turning movements, and vehicle type. In addition, the Department provided an estimate of annual average daily traffic (A.A.D.T.) and summer average daily traffic (S.A.D.T.) on Highway 48 as shown in Table 18.

Table 18

Average Annual and Summer Daily Traffic Volumes

Location	1969 A.A.D.T.	1970 A.A.D.T.	1971 A.A.D.T.	1972 A.A.D.T.	1972 S.A.D.T.
Highway 48 North of Wildhorse	50	50	50	50	70
Highway 48, South of Highway 1	445	440	430	395	540
Highway 1* East of Highway 48	NA	NA	NA	NA	2800
Highway 1* West of Highway 48	NA	NA	NA	NA	3200

* Estimated from 1971 intersection counts at Highway 1 and 48.

Data: Alberta Department of Highways and Transport

Based on this information, an estimate of S.A.D.T. volumes on highways in the area was developed as shown in Figure 15. This figure shows that Highway #1 is the only major east-west route in the area. The main park access is via Highway #48 south from Highway #1. The secondary highways in the area are very low volume routes with S.A.D.T.'s of less than 100 vehicles.

At the intersection of Highways #1 and #48, over 90 per cent of the traffic turning onto Highway #48 is eastbound on Highway #1 from Medicine Hat and the remaining 20 per cent is westbound from Irvine. Traffic along Highway #48 between Highway #1 and the Park entrance is comprised primarily of private automobiles (89% of all vehicles), with single-axle trucks (9%), buses (1%), and combination tractor-trailers (1%), making up the remaining volume.

The Provincial Parks Division has a counting station located on the access road between Highway #48 and the Elkwater community which records vehicles entering Elkwater on a daily basis during the summer months. The station is located west of the sideroad serving the Park administration buildings and the maintenance yard and, therefore, internal trips from these facilities to Elkwater are counted in addition to vehicles from Highway #48.

The daily number of vehicles crossing this counting station in 1972 is shown in Figure 16. During the counting period, an average daily traffic volume of 1,065 vehicles was recorded during weekends when volumes are typically two to three times those on weekdays.

This counting station indicates a steady annual growth in traffic volumes for the May to September period from 83,000 vehicles during the 1960 season to over 117,000 vehicles during the 1972 season.

CLASSIFIED ROAD SYSTEM

Classification Guidelines

A set of road classification guidelines was developed which places all roads within the Park into one of four classes according to its primary function: arterial, collector, local, or scenic drive. Design standards and criteria which best suit each class of road, were identified including length, range of operating speeds,

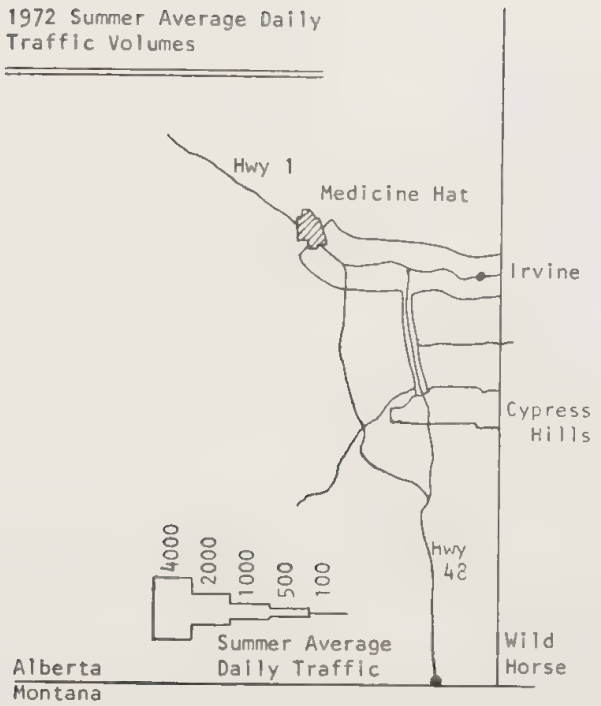


Figure 15. Data: Alberta Department of Highways and Transport.

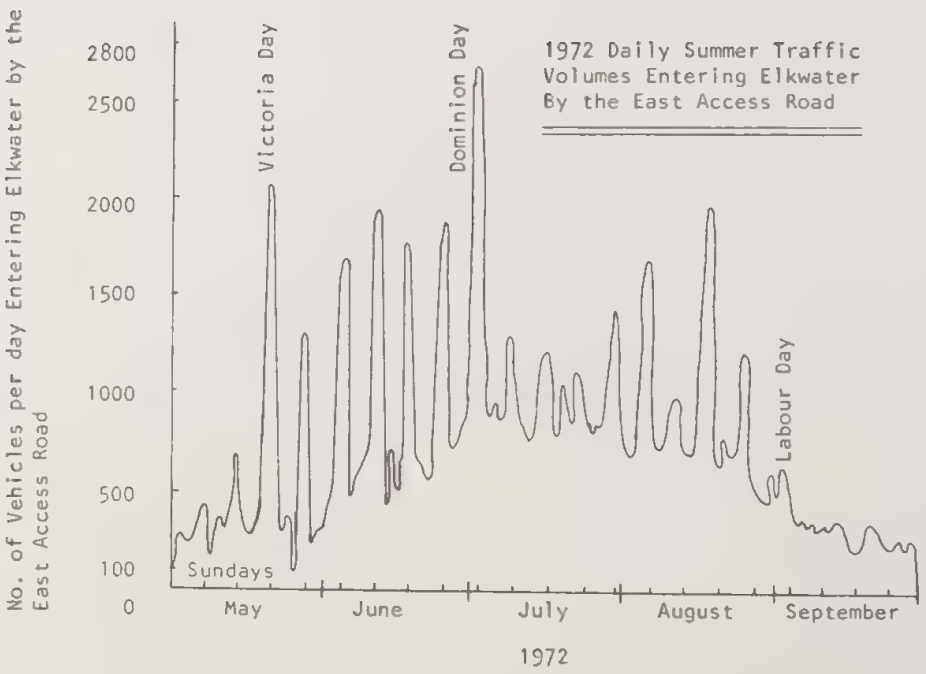


Figure 16. Data: Alberta Provincial Parks Division.

maximum vertical grades, surface type, and width. The road classification guidelines are shown in Table 19.

Road Classification

The existing road system within the Park was classified according to the classification system based on the present primary function of each section of road. The existing classified road system is shown in the Park Road Classification and Elkwater Road Classification Maps (23 and 24).

Cypress Hills Provincial Park presently has 58.7 miles of roads functioning as arterials, 3.3 miles of collectors, 4.8 miles of identifiable local roads, and 3.5 miles of scenic drive. In addition, there are numerous minor locals and dry-weather trials within the Park which were not included in the classified system.

PHYSICAL ROADWAY DEFICIENCIES

Types of Deficiencies

Physical deficiencies in the classified road system were identified by comparing the actual road characteristics with the road classification guidelines as shown in Table 19.

Substandard characteristics of the road which could cause a sectional deficiency include:

- operating speed
- surface type
- surface width, or
- alignment.

Within Elkwater, other deficiencies were also identified.

Features constituting other deficiencies include:

- lack of buffering of adjacent land use
- road side hazards
- lack of access control
- lack of traffic control
- inadequate signing, and
- inadequate intersection geometrics.

Existing and Future Road Deficiencies

Existing road deficiencies are identified on the Cypress Hills Park and Elkwater Deficiency Maps (25 and 26). These maps show that many sections of the inventoried road system have at least one deficient characteristic when considered in terms of the current road classification.

PROPOSED EXTERNAL ROAD IMPROVEMENTS

Information on proposed road improvement outside, but adjacent to the park boundaries was supplied by Mr. M. J. Dolinsky, P. Eng., Chief Planning Engineer, Department of Highways and Transport, Alberta.

Improvements to Existing Facilities

Short term road improvements to the Provincial Highway system (Map 1) include:

a) Repaving of Highway #48 from Highway #1 to Elkwater, during 1973-74, a distance of 21 miles (26 feet top width).

b) Grading of Highway #48 from the end of pavement about 8 miles

Table 19

Cypress Hills Provincial Park

Road Classification Guidelines

Class	Function	Length (Miles) Min.	Max.	Operating Speed (mph) Min.	Max.	Driving Surface Type P-paved G-Gravel	Surface Width Including Shoulders Min.	Max.	Other Features	Maximum Desirable Vertical Grades Trailers, Campers, etc. permitted	Private Automobile only
Arterial	To provide for the movement of vehicles at relatively high speeds between the park entrance(s) and a major activity area or between major activity areas. This class of road provides the only connections to external roads.	2	-	30	60	P	26	36	- buffer from activity or wild-life areas, scenic lookouts - total length of this facility to be minimized. - minimize visibility of this class of facility from other park areas - no stopping permitted - no direct access to activities - provide scenic vistas where ever feasible	6	8
Collector	To provide vehicle access between the arterial roads and the activity areas.	1/4	2	20	30	P or G	26	32	- horizontal alignment to be used to control operating speeds - total length of this class of facility should be minimized except where increased length improves aesthetics from the road	8	10
Local	To provide low volume, low speed vehicle access within activity areas.	0	1	10	25	P or G	Two-way 10 One-way 12	22 16	- use horizontal alignment and/or configuration of riding surfaces to control operating speeds - use may be limited to service vehicles only - provides the only direct access within activity areas.	8	12
Scenic Drive	To provide a sight seeing activity which is vehicle oriented	5	35	15	25	P or G	Two-way 20 One-way 16	28 20	- use one-way roads when possible to reduce visual impact of traffic - provide frequent pullouts as a standard part of the facility design.	N.A.	12

south of the Cypress Hills Park boundary to north of Cressday, a distance of about 21 miles during 1973-74 and paving of that section during 1974-75 (32 feet top width).

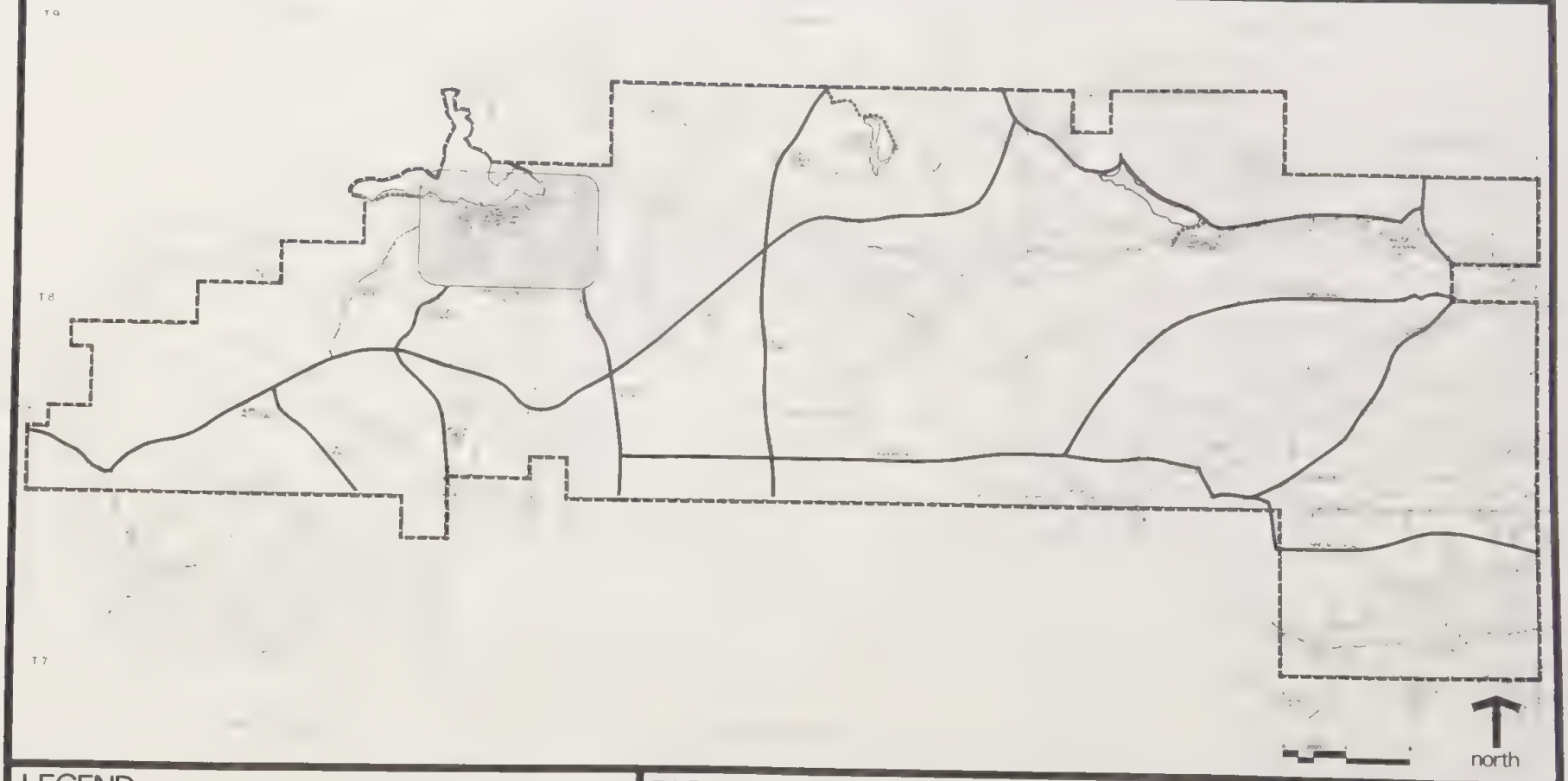
c) Grading of Highway #48 from north of Cressday to Wildhorse, at the U.S. border, a distance of 20 miles during 1974-75 and paving of that section during 1975-76 (32 feet top width).

Proposed New Facilities

Several new highways are proposed for development near the Park (Map 20). These highways are long range proposals and no date for development has been set. These new proposals include:

a) Highway #941, a new primary highway running southerly from Highway #1 near Dunmore to within one mile of Cypress Hills Provincial Park, and connecting to existing Highway #48 about 28 miles north of the U.S. border. This facility would become the long range primary north-south highway in the area, replacing Highway #48.

b) Highway #961, which is a proposed extension of existing Highway #61 from Orion to Highway #941.



LEGEND

PARK ROAD CLASSIFICATION

23

CYPRESS HILLS PROVINCIAL PARK

Alberta

RESOURCE INVENTORY ANALYSIS AND CONCEPT PLANNING

Lombard North Group

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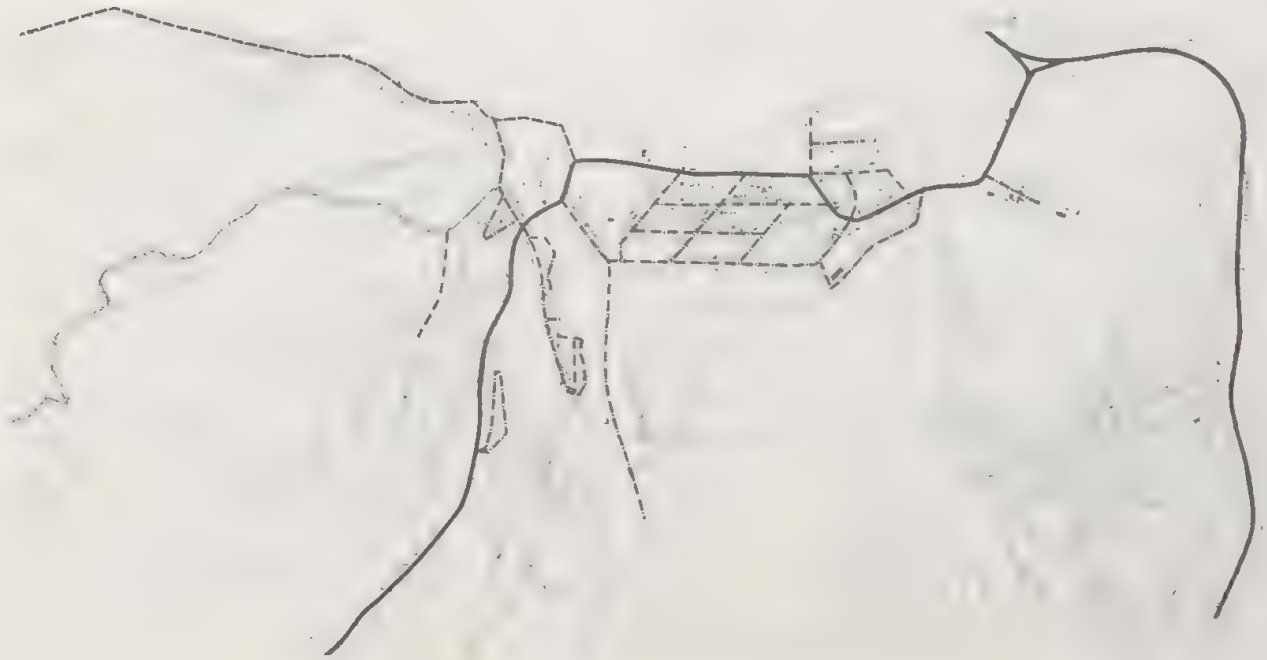

north

LEGEND

ELKWATER ROAD CLASSIFICATION

24

CYPRESS HILLS PROVINCIAL PARK

Alberta

RESOURCE INVENTORY ANALYSIS AND CONCEPTUAL PLANNING

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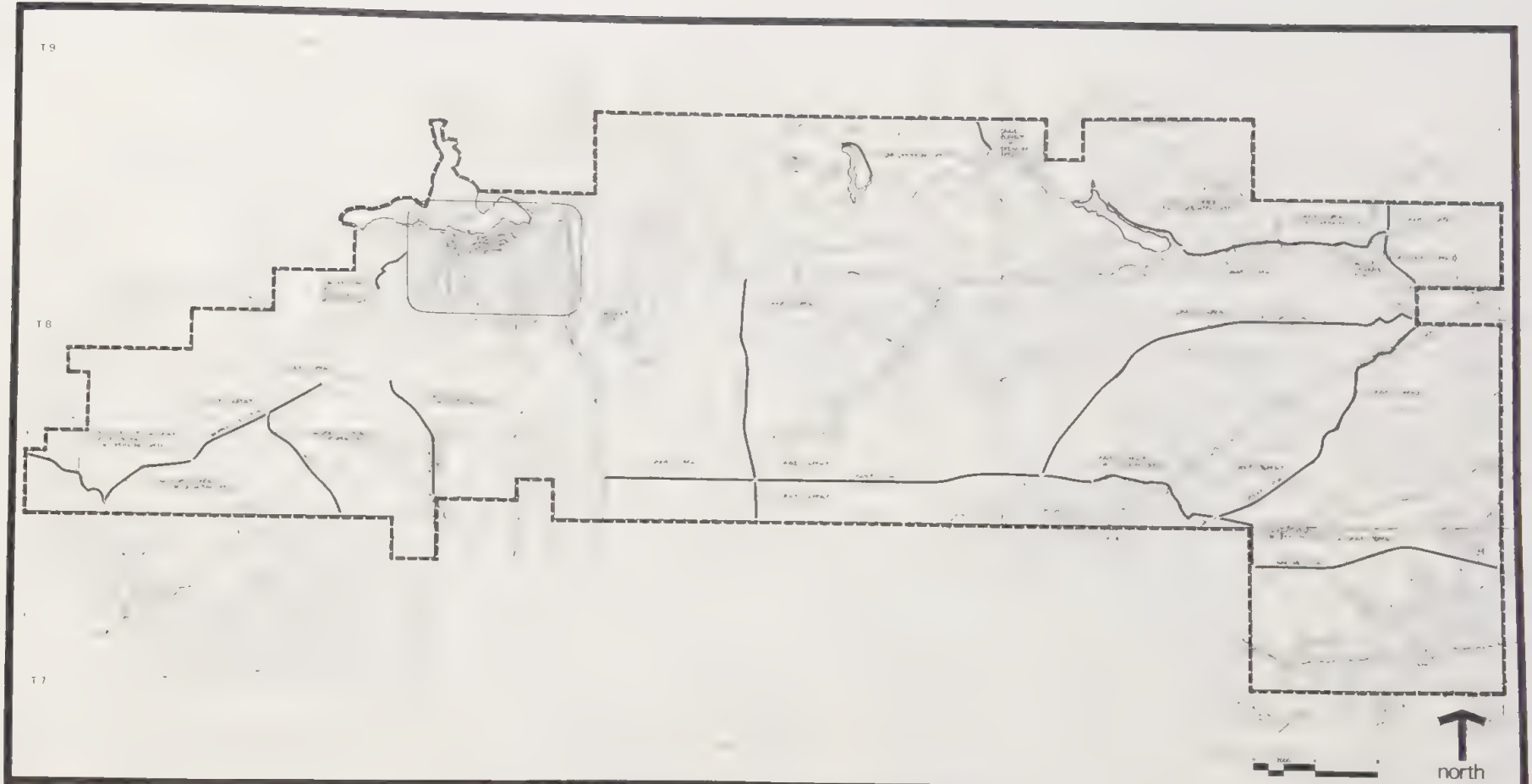

LEGEND

PARK ROAD DEFICIENCIES

25

CYPRESS HILLS PROVINCIAL PARK

Alberta

- DEPARTMENT OF PUBLIC WORKS
- DEPARTMENT OF LANDS AND FOR
PROVINCIAL PARKS DIVISION

RESOURCE INVENTORY, ANALYSIS AND CONCEPTUAL PLANNING

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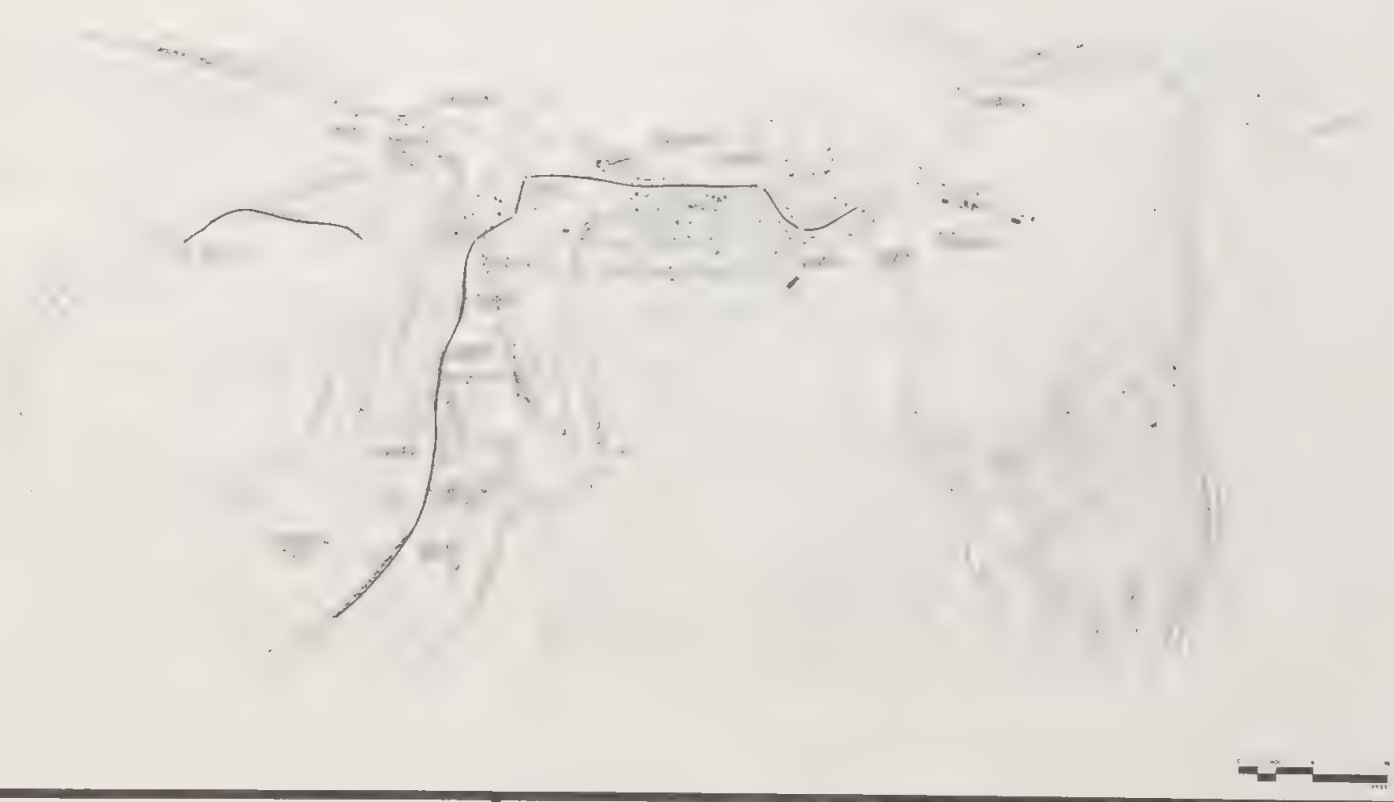

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LEGEND

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ELKWATER ROAD DEFICIENCIES

26

CYPRESS HILLS PROVINCIAL PARK

Alberta

RESOURCE INVENTORY ANALYSIS AND CONCEPTUAL PLANNING

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PARK OVERVIEW

FACILITIES EVALUATION

SITE CONDITION

DESIGN CRITERIA

● RECREATION FACILITIES

Cypress Hills Provincial Park is presently functioning as a regional park and the existing facilities and activities are a reflection of this function. The majority of the Park uses are of an active water-oriented nature (water skiing and motor boating), with areas of concentrated activity being around the southern shore of Elkwater Lake. Other activity areas mainly used for camping exist in the interior of the Park and these too are, in some way, associated with the presence of water.

Each of the activity areas has been studied to determine its ability to fulfill its intended function; with respect to this, there were five general questions investigated for each area:

1) Why is the activity located where it is?

2) Does the location contribute to a recreational experience, and if so, what kind?

3) Does the present use represent the designed function?

4) Is the use and capacity compatible with the environmental conditions?

5) What is the quality of the facilities and is the capacity sufficient to serve the demonstrated demands?

The format of this review consists of an inventory phase and an analysis phase. The inventory is represented by the two maps which graphically illustrate the quantity and distribution of all facilities (Maps 27 and 28).

PARK OVERVIEW

A general lack of continuity exists in the physical facilities of the Park. This is evident from the many architectural styles present in the townsite, all the way through to the several styles, shapes, and colours of the roadside markers. Several major headings will be used to discuss this lack of continuity.

1) Unity of Design.

2) Inter-relationship of Activities.

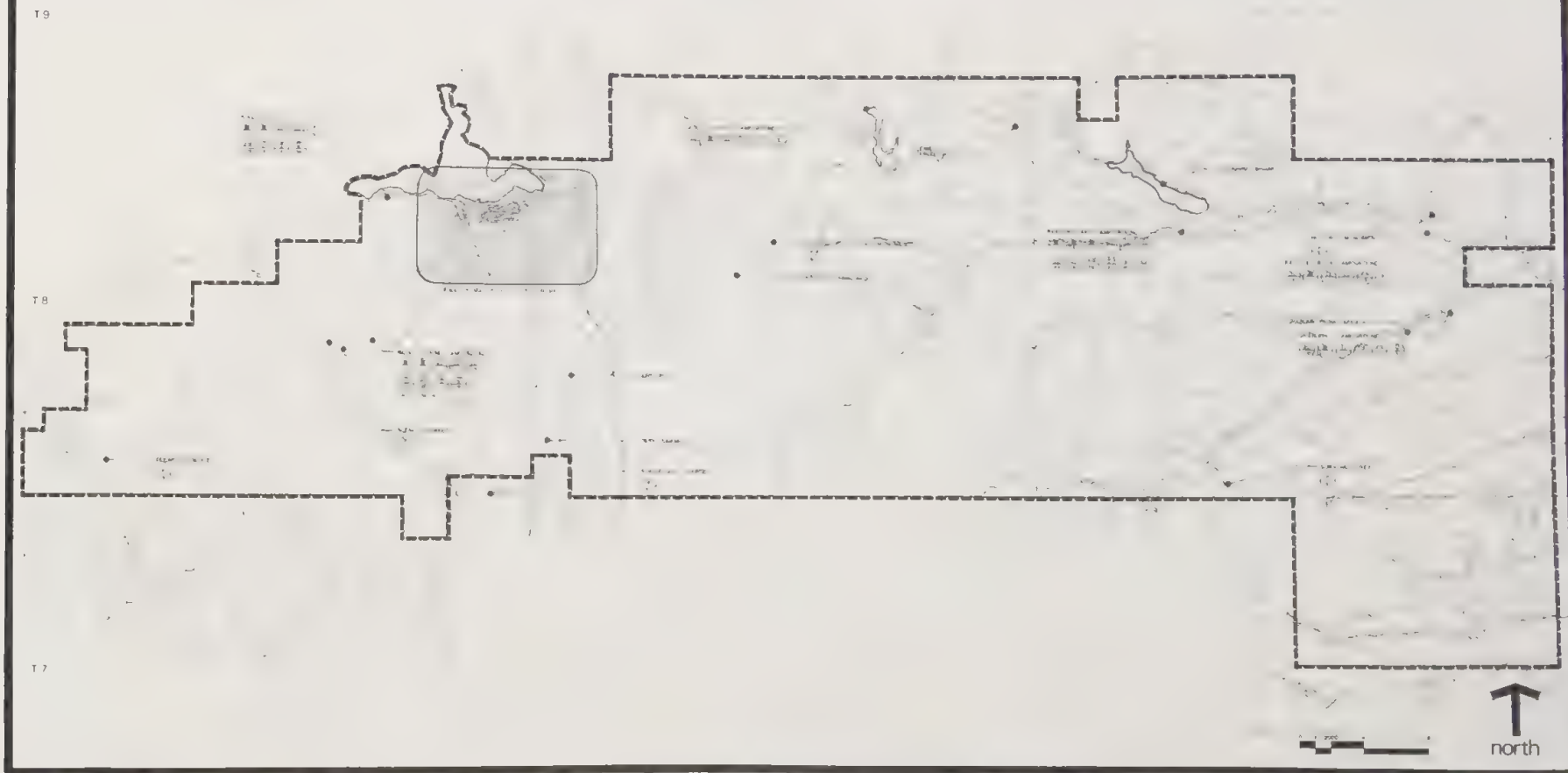
3) Flow Pattern.

Unity of Design

The lack of unity in the design of the physical elements which comprise the Park is one of the most noticeable deficiencies. Although it would be more difficult to set standards for architectural controls for the design and materials used in the townsite, the Park should at least be consistent in the design of Park buildings. Roof styles and types of building materials change from building to building in the campgrounds, day use swimming area, and picnic areas. Flat-roofed concrete block buildings exist side by side with gable roofed log-sided structures. Roadside obstructions vary from wagon wheels, to square red and white posts, to round red and white posts, to round green and white posts, to guard-rails and concrete curbs. This total lack of unity is a result of unplanned development.

Inter-relationship of Activities

Very little grouping of similar activities occurs within the Park. Campgrounds are dispersed throughout the Park with very little consideration given for the needs of the campers outside of their immediate location. Campgrounds should be grouped within walking distance of an activity centre and water, where possible, to minimize the use of the automobile. Cypress Hills Park seems oriented to the Elkwater townspeople rather than visitors from the rest of the province. All major activity centre functions are grouped



LEGEND

PARK INVENTORY OF FACILITIES

27

CYPRESS HILLS PROVINCIAL PARK

Alberta

RESOURCE INVENTORY, ANALYSIS AND CONCEPTUAL PLANNING

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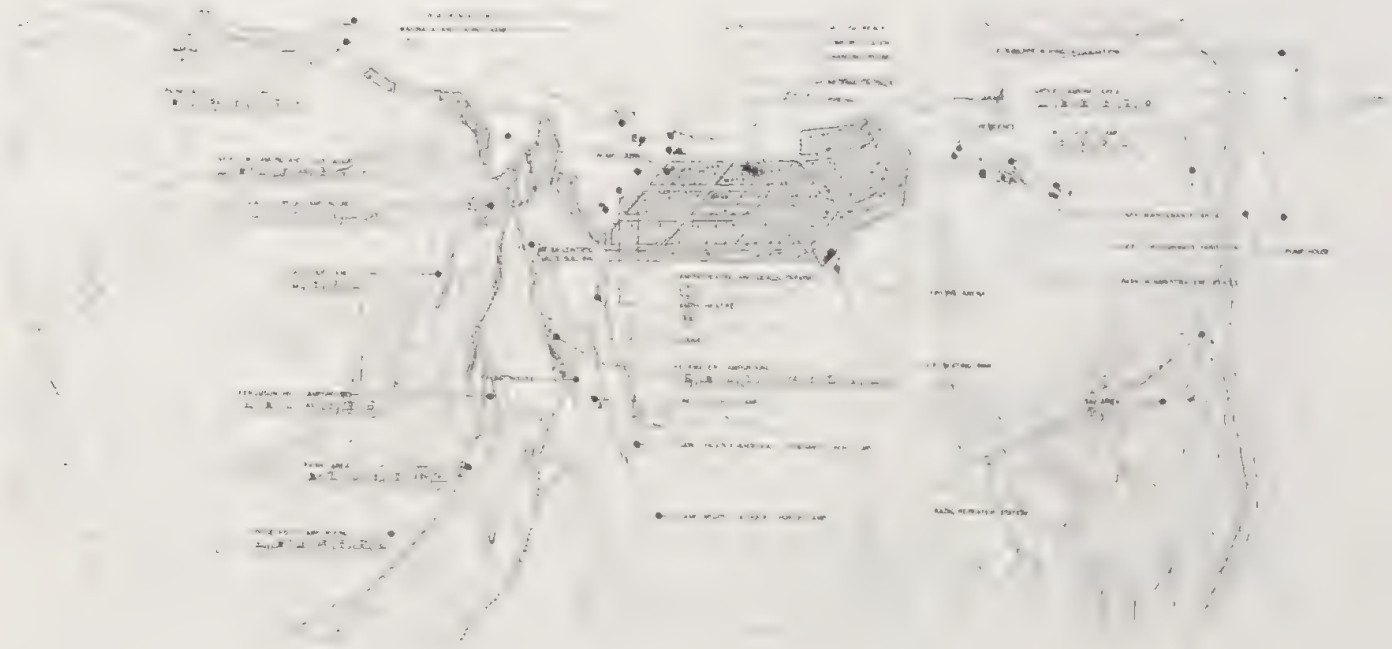

north

LEGEND

ELKWATER INVENTORY OF EXISTING FACILITIES

28

CYPRESS HILLS PROVINCIAL PARK

Alberta

RESOURCE INVENTORY ANALYSIS AND CONCEPTUAL PLANNING

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within the townsite. Entertainment in the form of amphitheatre and lodge are located here, well away from the majority of campgrounds. Provisions are available only in the townsite and the major day use beach is located adjacent to the townsite, again well away from the majority of campsites. In fact, private leased lots actually form a barrier between the public campgrounds and the public beach.

Poor relationships between facilities and lack of relationships exist throughout the Park. The amphitheatre and lodge, for example, should bear a relationship with other facilities such as camping or other forms of activities.

The amphitheatre could be more directly related to a group of campgrounds in order to establish a social node to which campers would be drawn.

The Battle Creek Campground and the Graburn Campground also display this lack of relationship to other forms of activities or facilities. The list goes on and on. This predominant deficit in the design results in many more problems such as the next topic to be examined, Flow Patterns.

Flow Patterns

A very important aspect to the design of any park should be a continuous and logical flow pattern between facilities. With the implementation of an orderly system of movement from one activity or facility to another, a harmony is established in the overall design of the area. Cypress Hills Provincial Park has no such continuous pattern of traffic flow for vehicles or pedestrians.

The problems stem from the abundance of roads built into the Park from every direction for purposes other than recreational or scenic use. These roads were built by ranchers in order to reach their grazing areas and since then, have been upgraded and turned into Park roads. Activities have developed along these roads in an unplanned and scattered manner and as a result, no continuity exists.

Further intensifying the problem, is the presence of Highway #48 bisecting the Park into two parts. A major highway leading through the Park creates a substantial barrier to developing a continuous flow pattern in an east-west direction for both pedestrians and other forms of traffic.

It must be recognized that for the Park to function in an organized manner, the numerous facilities should be studied and a logical system of traffic flow must be developed.

FACILITIES EVALUATION

Beaver Creek Campground

The location of this campground was determined by several factors: available open and accessible land, nearness to major attractions (Elkwater Lake and an activity centre), and availability of desirable services. While the location is advantageous for these reasons, it is a disadvantage in other respects.

A disadvantage to this location is in the confinement presented by the surrounding facilities. Private lots, a Girl Guide Camp, and Elkwater Campground completely surround the site, limiting its size and creating high density within the area. Thirty-nine camping units on three and one-half acres, a density in excess of 11 units per acre, creates a situation which is urban in character, rather than a pleasant recreational experience. A second disadvantage to the location of this campground is the barrier formed between it and the lake by a section of private leased lots.

Serviced campgrounds such as Beaver Creek Campground are usually designed for long term stays, as the time involved in making all connections usually warrants an extended visit. Campers who are constantly on the move rarely use the serviced sites, preferring instead to use the pumpout and water stations provided in conjunction with most major campgrounds. While the use of this campground does represent its intended function, it fails to provide the long term camper with the positive recreational experience for which he has come, mainly due to the high density.

Four to six units per acre will provide enough privacy and open space in a well designed campground to offer an attractive recreational experience, while keeping the facility economically feasible. In order to establish a serviced campground of this density, there should normally be between 80 and 120 campsites.

With the removal of a section of cottages on leased land and the takeover of the Girl Guide Camp, an area of 16 to 17 acres could be made available for a serviced campground capable of supporting approximately one hundred units at a reasonable density.

The formal nature of the facilities provided in this campground are not at all compatible with a natural park experience. A 10 to 20 foot grass strip between units might be a tolerable condition in a wayside campground for overnight stays, but should hardly be encouraged within a nature-oriented park. The park experience itself is severely hampered by the close proximity of units and the urban atmosphere created by the use of well manicured lawns between concrete curbed and asphalt paved campsites. The standard garbage can, seen at the corner of each drive in the city on garbage collection days, is in evidence at the corner of each campsite, adding even further to the urban effect of each campsite and the campground. A central garbage collection point could vastly improve the aesthetics and would not be too inconvenient as the distance between extremities of the site is small.

Although trails are indicated leaving the campground, the type of trail, its interest features, and possible destinations along its route are not elaborated on. Proper signing would fill these voids while providing a new dimension of interest for the camper.

While inefficient for a campground of this size, a control element is a valuable facility in campground design and operation. A manned control station helps to provide the privacy expected by campers by discouraging vandals and intruders after daylight hours. An attendant can provide campers with information concerning available camping sites, control excessive vehicular movement within a campground, and look after general maintenance for a campground of 80 to 100 units. The control element lacking in this campground could only be justified with expansion and rearrangement of the existing facilities. The ever-increasing demand for fully serviced campsites, growing parallel with the mobile recreation home industry, seems to warrant redesigning this campground area.

In summary, the quality of the existing facilities in Beaver Creek Campground is high, possibly too high, creating a situation which is urban in character rather than that which is to be expected of a natural park. The quality of the park experience is diminished by this facility such as it is, and corrective measures should be taken in order to rectify the problem.

Elkwater Campground

Elkwater Campground, like Beaver Creek Campground, was located on the basis of available open and serviceable land adjacent to the lake. The problems in this location are again much the same as those of Beaver Creek Campground. A barrier between the lake and recreational open space and the campground, is presented by the presence of cottages built on leased land adjacent to the campground. The logical flow pattern from the campground to areas set aside for recreational use is broken by the presence of this obstruction. While the location has the potential for offering

convenient access to areas of high recreational value, creating a quality recreational experience, the effect is lost in having to make the transition from a camping experience to an urban environment and then on to a recreational environment.

Good forest cover, the presence of a stream, and deer running loose within the area make this location an excellent site for a medium density camping experience, however, confined space has again led to a high density situation within this campground. While 126 sites on approximately 13 acres, indicates a density of only nine units per acre, the actual density is much higher due to the large open games area included in the gross acre figure. A density in excess of six units per acre does not allow for the privacy and space enjoyment which should be part of a camping experience.

Elkwater Campground was designed and built as a semi-serviced campground with electrical outlets at, or available to, most sites and water sources within a reasonable walking distance of all sites. While the placement and provision of services is adequate, the proximity of individual sites is a detriment to the enjoyment of the campground and therefore effects the function of the campground.

The lack of controls and resulting excessive overburdening of the area is evident in the condition of the forest floor. Ground cover vegetation is practically non-existent within the campground. Serious consequences can result from this lack of vegetative cover and the trampling which has brought this condition about.

Trampling of soil, the resulting compaction and loss of aeration, can result in the deterioration of trees to the point where forest fires present a very serious threat.

Lower design densities and the layout of specific, well defined trails will result in the regeneration of vegetative cover and an improvement in the overall aesthetics of the campground, not to mention on improved quality of recreational experience.

As is the case throughout the Park, many of the individual facilities are well-built and fulfill their functions, but too many styles have been used in a small defined area. Traffic barriers and building styles take on several different styles, forms, or colours throughout the campground. Standardization of these facilities would improve the aesthetics as well as help lessen confusion as to the function of each.

Particular facilities which stand out as incongruous elements in the design are the very formal building and accompanying city street lights at the control station. These elements should convey a feeling of welcome and express the character of the campground rather than express a feeling of strong rigid control of urban quality.

The city street corner telephone booth looks foreign in a park environment. A design should be worked out for incorporating telephones into a structure made of native materials.

Circulation also presents some problems within the campground. Short turning radii and narrow trailer sites have resulted in the scarring of many trees on corners and site entrances, while lack of a logical flow direction and a number of alternative turnabouts cause confusion and operational problems.

While it must be said that the quality, quantity, and capacity of most of the facilities within this campground is adequate, the problems are derived from a lack of an overall design for the facilities and a lack of sufficient area on which to place them.

Ferguson Hill Campground

The Ferguson Hill Campground appears to have been located on this site because it offered unoccupied land in proximity to the Park's

core and the activities associated with the town and the lake.

This location, while possessing the potential of providing a pleasant recreational experience (good view, well treed area) does not sustain itself. It is interrelated with, and dependent upon, the facilities below the escarpment and consequently there is considerable movement up and down the connecting road.

This demand for interaction has created significant volumes of internal automobile movement since Ferguson Hill is fairly distant from the bulk of the other activities and this, plus the climb up the hill, appears to have discouraged pedestrian circulation.

The dense mature softwood forest covering the site, has a reasonably high capability for providing well screened, individual campsites, but the existing development is a high density (13 units per acre) insensitive treatment of the property.

There are 83 unserviced campsites occupying an area of approximately six acres. To provide a reasonable amount of privacy and the necessary protection of the fragile environment, a density of four to six units per acre should be considered as a maximum density. The results of extreme densities are blatantly obvious in this campground. To achieve this density, the individual sites were built much too narrow and on such an angle to the collector that many accidents have resulted in heavy scarring of the trees at the corners of each site.

In order to provide enough room for the camping units, the vegetative matter on the forest floor has been sacrificed. With continued intensive use, compaction of the soil could result to such an extent that tree roots will be unable to receive air and will consequently die, leaving the area very susceptible to forest fires and severe erosion.

The children's playfield is located on the northern most point of the plateau in an extremely dangerous area. To the west of the play lot, there is a vertical drop of approximately 50 feet to the road below. No warning or fencing currently exists to protect children from this hazard.

Walking trails should be developed between this campground and the main activity centre, in order to encourage walking rather than increased driving between areas.

High densities and the resulting destruction to the environment, the hazards in the playground area, and the lack of adequate pedestrian circulation are all problems to be overcome for the betterment of this campground.

This campground is relatively new, and not too much deterioration has yet resulted. It must be corrected before real problems are encountered.

Lodge Pole Campground

Forty-seven unserviced campsites on approximately five acres give this campground a density in excess of nine units per acre. This lower density allows better spacing of campsites which results in more privacy for the individual.

Severe scarring of trees on corners has resulted from the combination of narrow drive lanes and short turning radii. Back in camping sites should be on a greater angle to the collector road through the campground. The sites are difficult to negotiate with a trailer unit and many trees have been damaged as a result.

Few trails exist here as in other campgrounds, but the forest floor cover has not been destroyed to the same extent due to the relatively lower overall density. Protection of the existing vegetation can only occur with the development of defined trails leading to washrooms and water sources.

A disadvantage to the location of this campground is in its proximity to the Ferguson Hill Road. Much of the privacy and solitude expected by campers is lost in a situation where campsites are within one hundred feet of major arterials.

It is recommended that a distance from five hundred feet to one quarter of a mile with dense forest cover should be permitted to act as a buffer between campgrounds and heavily travelled roads.

One of the prime deficiencies which exist with respect to this campground as well as most others is the lack of social nodes or activities centres within walking distance. Because of the lack of facilities at the camper's immediate disposal, the use of the automobile is promoted resulting in the increased flow of traffic within the campground.

An element which detracts from the aesthetics of each campground and creates more maintenance problems is the use of refuse containers at each site. One container or four containers located in a central location between four to six sites are economical from a maintenance standpoint and these can be better screened or hidden from direct view to improve the overall aesthetics of the area.

Circulation problems seem to stand out as the major problem here, as in most campgrounds. With improved vehicular and pedestrian trail systems, this campground could function well, but would still be at a disadvantage because of its location (if road is to be used as a permanent means of access).

Graburn Campground

The rationale for locating a campground here is questionable, since the dry creek bed and the dust created by the lack of vegetative cover are not particularly attractive features; their contribution to any kind of recreational experience is also limited.

All of the existing facilities are in fairly good condition, with the exception of the tables which require paint, however, additional tables at a standard of two tables per camping unit would be required to adequately service the 20 units reported to be the maximum capacity of this area.

Camping permits indicate that the average party size is four persons per unit. Assuming that this applies to both the outlying campgrounds and the higher density areas closer to Elkwater, then six additional toilets, three male, three female, would be required.

Battle Creek Campground

The Battle Creek Campground is similar in design philosophy to the Graburn site. It is an unplanned area permitting unrestricted camping and vehicular circulation throughout the campground. Cattle have also managed to enter the campground, either through breaks in the fence or through the gate which is often left open by campers. Damage created by such an infringement, although mainly aesthetic, is disruptive to the camping experience.

Potential here for continued use is greater than at the Graburn site, mainly because of the higher tolerance of the vegetative cover to such an activity, but also because there is afforded here a splendid view of the Cypress Hills skyline.

Nichol Spring Campground

It is estimated that about 25 camping units could be accommodated in this compound. These are on unplanned sites which have no

defined road system to facilitate circulation. Original use, as with the Graburn and Battle Creek campgrounds, was intended to be restricted to tenting, however, the increasing popularity of camper trailers and similar vehicles and the lack of control of their movement has created a management problem.

Reesor Lake Campground

This campground is a fenced enclosure designed to accommodate approximately 54 units. Support facilities have been provided with some degree of planning. Despite this attempt at control, certain deficiencies in the plan have contributed to a misuse of the site. There is inadequate provision for mobile camping units due mainly to an inflexibility in the space allocated for each unit. The post barriers surrounding the off-road gravelled spaces are adequate for one automobile only and the intended camping space being inaccessible to any wheeled vehicle can only be used by tents. This is inconsistent with the demands of most campers. The density of use here is similar to that in the Lodge Pole campground, however, since the exact acreage cannot be determined, the gross density cannot be calculated (an estimate is eight units per acre - a more desirable condition would be three to five units per acre).

The tent platforms are antiquated structures no longer sufficient to perform their intended function. Most tents now with the built-in floors neither require the platform nor are designed to be erected on such a base. Tent trailers find such facilities to be a restriction.

Spruce Coulee Campground

The Spruce Coulee campground is another one of the unplanned enclosures similar to the Graburn, Battle Creek and Nichol Spring sites.

There is a cleared untreated road intended to guide internal circulation, however, movement along this road has eroded the soils and damaged or removed the vegetation. It has also facilitated vehicular movement throughout the entire enclosure and this has caused considerable disturbance to the soils and vegetation.

Movement between the reservoir and the enclosure is controlled by the cattle fence. This has created a poor interrelationship between the camping and water oriented activities. The infringement of cattle is especially noticeable in this area where their presence has severely rutted the shore of the reservoir and cattle dung has become an obstacle for pedestrians.

The aesthetics of using this water body for swimming are limited by the weeds and algae in the water and the damaged shoreline.

Ski Area

The ski area is located on the western side of Highway #48, about one mile southeast of the town of Elkwater. It has been developed on land owned by the Park which is leased to the operators of the area. These persons who are mainly residents of Medicine Hat, have organized to provide ski facilities, primarily for themselves, in an area close to their homes. The existing facilities in Alberta are over 200 miles away and are usually quite crowded

Through the sale of shares, they have been able to finance the purchase and installation of the existing lift and snow grooming equipment. All trails were developed by the shareholders themselves using volunteer labour. Such an arrangement is reported to have enabled the area to offer fairly high quality skiing at a relatively low cost per skier ($4.00 per day).

The hill itself is a northeast facing slope with a vertical drop of 550 feet. Four trails have been opened, giving the area approximately 22 acres of skiable terrain (grades over these trails vary between 17% and 32% with the steepest sections being towards the top). Novice skiers can avoid the more difficult upper sections by unloading half way up the hill.

Lift facilities consist of one "Cana-Poma" made T-bar about 2,800 feet long. It is reported that the lift is in good condition with the only problem being the shiv assembly holddown out over #1, where excessive tension and wear has necessitated the installation at an additional pulley on the shiv assembly.

Other facilities include an 18' by 42' warming lodge in the base area, two privies, a patroller's first aid cabin, a cabin for the ski instructors, a phone booth, and a chipboard "A" shaped structure used as a wood storage area.
(Note: trails extremely well hidden - very well revegetated).

In evaluating this area, the initial and most important observation to be noted is that the quality of skiing here on the existing trail system, is quite good. There appears to be a good distribution of terrain of the novice and intermediate degrees of difficulty, however, the expert terrain towards the top of the hill on the northern trail can only be considered to be moderately challenging, but this should not seriously restrict the hill's primary function which is to supply family-oriented skiing.

Aside from the above noted features, there are some major deficiencies in the physical plant which prevent the area from making maximum use of its potential. These are cited below:

a) There is a creek flowing through the base area which has been bridged to allow skiers to cross where necessary. This will restrict movement in the base area and cause snow control problems over the bridges where use is excessive.

b) Provision for parking is totally inadequate. It is reported that on a peak day, there may be 500 skiers at the area yet the only space available for parking is along the crescent-shaped access road where about 20 cars might be kept. Bussing from Medicine Hat only partially alleviates the situation.

c) The lodge is an 18' by 42', one story, frame, post and beam structure. Picnic type tables are the only furnishings and the heating system is limited to two wood fueled stoves. Visually, the lodge resembles an enclosed picnic shelter similar in colour and style to those throughout the rest of the park. This building functions only as a warming hut and does not offer any other facilities such as food service (food can be purchased from a catering truck at the lunch hour) and equipment sale and rental normally associated with a ski lodge.

The location at the base of the southern runs creates a skier circulation problem between the lodge and the loading terminal for the lift because it means that the skiers are forced to travel over about 600 feet of flat ground.

d) The washroom facilities consist of two privies located across the creek from the lodge. These buildings, aside from being cold and uncomfortable, must be detrimental to the image of the area when it is compared with other ski areas in Alberta.

e) Ground water seepage is present on the slope directly south of the lift. This is reported to cause a problem with snow grooming (icing will occur) and it should be treated since this run is one of the most heavily used.

f) The access road is a crescent-shaped, gravel-surfaced road which also doubles as a parking area for visitors. Three problems were noted, those being:

i) the entrance is not clearly marked
ii) the entrance from, and the exit to, Highway #48 are not perpendicular to the highway and are also on slight grades, causing a reduction in visibility and potential

traction problems during ice conditions.

iii) the road is not suitable for use as a parking area (sight lines - not good).

g) The capacity relationship of the lodge, parking area, lift, and ski terrain is inadequate. It has been calculated using standards normally associated with well developed ski areas that the lodge has a capacity of about 140 persons per day, the lift 400 persons per day, the parking about 70 persons per day, and the ski terrain 540 skiers per day. Obviously both the lodge and the parking space are extremely deficient and the lift with a capacity of 400 skiers will have about 10 minute line-ups.

h) Ski terrain is in some places, too narrow.

In summary, there is a good mountain layout but extremely poor base area for ski and vehicular circulation.

Elkwater Golf and Country Club

The Elkwater nine-hole golf course is situated on a relatively flat, open plain outside the Park. The greens and trees appear to have been sited at existing grade in areas where surface drainage was adequate. The fairways are very flat, wide open, and lack direction to a great degree. Little additional vegetation has been added to improve the situation; with the absence of any sand trap or mounding complexes, the entire golf course lacks significant interest, character, and challenge, elements essential for today's game of golf.

Although the course is outdated architecturally, it seems to have served its purpose in the past. The routing appears to have at least provided players with an interesting variety of golf shots.

The existing course is 500 to 1,000 yards shorter than golf courses which have been built since 1950. The ideal 18-hole course should measure 6,500 to 7,000 yards in length and be flexible within this range through the use of multiple or expandable tees.

Teeing surfaces on modern golf courses are not built at grade, but are elevated 1-1/2" to 2" and tilt up from back to front, approximately 4" to 6" for drainage and for the proper projectory of the tee shot. Green surfaces should again be elevated not only for drainage, but also for proper ball action. A green built at grade in Elkwater for example, would harden as the season progressed, forcing players to pitch and run each approacn shot on to the putting surface. Modern elevated greens are slung between mounding which, together with proper plant material, gives the player depth perception, allowing him to choose the right club and place his putt close to the pin.

Again, the most obvious elements missing at Elkwater are fairway and green mounding, water (ponds or water courses), and vegetation. These are the features which provide the depth of field, direction, safety, and beauty so necessary to the game of golf.

Day Use Areas

Day use areas included in this analysis are the two picnic-overflow camping areas and the beach area.

The picnic-overflow camping area located northeast of the Beaver Creek campground in a cleared, grass covered area of approximately five acres. Park management reports that as many as 200 camping or picnic units could be accommodated here at one time.

This site was developed for the obvious reason that it provides relatively easy access to the lake and users enjoy this convenience, however, it does create circulation problems for campers in the

Beaver Creek and Elkwater campgrounds who must pass through or detour around the picnic site to reach the water. This, at present, is not a serious problem since the shoreline here has not been developed. This situation could contribute to a poor inter-relationship of space and activities, especially if camping is continued on the site. Existing facilities are well maintained but as illustrated on the inventory chart they are insufficient to service the maximum users reported by the park management staff.

The western picnic area is one of the Park's most attractive activity areas. The open, grassed playground area rises and blends into the treed hillside in a visually appealing manner. Facilities here are also quite well maintained, but as in other instances noted throughout the Park, the bright colouring and the use of unnatural materials, detracts from the attempts to work within an undisturbed natural setting.

The provision of defined picnic sites, often used for camping, creates lower densities of use than could be accommodated if movement of users was unrestricted. This, however, could only be possible if camping was completely eliminated from the area. Both sites should also provide sufficient formally defined and concentrated parking for picnic users. Unrestricted automobile circulation should be prohibited because of the conflicts between pedestrians and vehicles, and because of the vegetation damage created by the lack of control.

The beach area has 250 linear feet of water frontage and about 30,000 square feet of supervised swimming. The standard usually applied to determine the capacity of such a facility is 25 feet per 150 users per day. On this basis, there is capacity for 1,500 swimmers per day. No statistics are available on the peak day use, however, it is expected that the facility is heavily over-taxed. The back beach area should have an area of about five times the water area. At Elkwater, the real back beach only slightly exceeds the water area and although other areas are used for sunbathing and related activities, movement to and from the water is not as simple when the areas are disjointed.

Architectural control on the three structures, change room, lavatory, and snack bar, would have prevented the dissimilarity of building styles and colours which would have been desirable from an aesthetic view point.

Marina

This activity area contains a well built, fully utilized docking area with a capacity of 80 small craft, a concrete launching ramp and a gravel surfaced parking area about 1/2 acre in size. The parking space is sufficiently large enough to accommodate the requirements of one launching ramp at 75 parking spaces/ramp, but it may be that during peak days there are too many boating activities on the lake. In consideration of the lake's size (450 acres) and the passive activities of fishing and canoeing, which occur here, it is suggested that a density standard of about 30 acres/water skiing boat or a maximum 15 boats be used in controlling this activity.

It is also suggested that the parking lot be formally defined and surface treated to improve the appearance and contain the dust. The metal retaining rail might also be removed from the dock and a natural material could be used which would be more compatible with the flavour of the Park.

Rodeo Grounds

The rodeo grounds, operated by the Elkwater Roping Association, are located on a 9.9 acre site east of Highway #48. It appears that this location was chosen because of the presence of the cleared land associated with the old farm.

Pedestrian Footpath

During the production of this report, a pedestrian interpretive footpath was in the process of being built to Spruce Coulee from the town. This is a much needed facility which, if functioning properly, would provide an outlet for "back-packing" and the means required to encourage exploration of the interior of the Park and its natural environment. Unfortunately, cattle have become familiar with this trail system and have, through trampling, created a very uneven and potentially hazardous surface.

Lookout

The formally prepared viewpoint area overlooking Reesor Lake is an exceptional location and the idea of capitalizing on this natural amenity is sound. The actual layout, however, could be improved if:

a) provision was made for seating of visitors
b) the viewpoint was removed further from the automobile parking.
c) the viewpoint was removed further from the road

A scenic viewpoint along the western ridge and a scenic drive could also become an integral part of the Park system. In the preparation of any future observation areas, care should be taken to avoid making these areas conveniently accessible by automobile.

Fishing Areas

A fishing dock has been provided at Reesor Lake and this facility appears to be well used by visitors.

Other comments also relevant to the Reesor Lake area include:

a) the dam requires landscaping to soften its engineered look
b) a formally developed pedestrian trail system should be developed around the lake, with the necessary support parking, to create a controlled circulation system.

The Spruce Coulee Reservoir, presently used by fishermen who fish from the shore, wade along it, or use motorless boats, has no formally developed facilities. This water body is too small and shallow to support intensive use. The shoreline in most areas has not been treated to transform it into a proper shore capable of accommodating the rise in the water level. Because of these prohibitive factors, use of the water body and its shoreline should be limited to low density activities. However, by creating a formal access road to the reservoir, intensive use has been encouraged. The minimal facilities in the supporting campground are, consequently, overburdened. In view of this, it is suggested that the road and support facilities should be reviewed. It is also suggested that a formally developed and managed trail be provided around the reservoir, however, it is not deemed necessary that fishing docks be constructed here.

Reesor Lake might be provided with increased boat launching facilities, however, policy of restricting use to non-motorized craft should be continued.

Maintenance Area

This activity area is well located, screened, and organized with respect to the existing development in the Park, but any realignment of the roads or user areas could alter this.

Efforts might be made to define stock pile areas which would separate this function from the maintenance area, but this is not critical.

The only outstanding issue related to this area is its use by the Department of Highways. Park maintenance and the economic savings created by a common base for operations are acknowledged, but the Park maintenance area should house only those operations which are vital to the operation of the Park. Incidental facilities are incompatible, often infringing upon the Park environment. (e.g. Department of Highway trucks and crews using Park roads and commercial facilities within the town).

SITE CONDITION

In conjunction with the spatial and functional assessment of the various campground facilities, a site condition survey was also conducted to determine the physical condition of each site.

The potential physical impact from recreational use is characterized in the physical damage sequence depicted in Table 20.

Table 20

Physical Damage Sequence

Trampling	→	Disturbance	→	Damage
People		Vegetative Cover		Erosion (water & wind)
Animals		Topsoil		Instability
Vehicles				

This physical damage sequence is expanded in Table 21 to include the specific indicators of physical disruption which reflect the crux of the physical capability concern.

Table 21

Indicators of Physical Disturbance and Damage

Trampling	→	Disturbance	→	Damage
		Impaired Vegetation		Deep Ruts
		Partially stripped Vegetation		Exposed Roots and Rocks
		Bare Soil		Deep Mud
		Soil Compaction		Multiple Trails

Overuse of a particular site - whether it be a campground, picnic area, or trail - will lead to disturbance of the natural protective factors such as the vegetative cover and the organic-rich topsoil. With the removal of this natural protection, the underlying mineral soil is exposed to erosion and a situation of continual deterioration prevails (Photographs 47 and 48).

Integral to avoiding or mitigating site deterioration is an evaluation of the various physical factors of a site to determine its natural capability to support recreational use. This information then indicates the appropriate design criteria to employ, if that site is to be attractive for use on a continuing basis.

Site Evaluation

The basic physical factors involved in site evaluation include

climate, vegetation, topography, and soil properties. The climate, through heat and moisture supply, controls the type and vigor of vegetation growth. The vegetation protects the soil from water and wind erosion. The topography and soil properties influence plant growth and the degree of erodibility. Together, these factors constitute the natural protective factors and determine the resilience of a site to recreational use.

A site capability rating system incorporating these factors is illustrated in Table 22. In this approach, factors 1 through 8 are additive whereas factor 9, soil texture and drainage, because of its importance, is a multiplier. The numerical total derived then indicates the site's capability rating, ranging from "not recommended" for use to "high" capability.

The results of a site capability survey utilizing this system are documented in Table 23; these represent average values from the 20 sites examined. This evaluation indicates that the plateau grassland and the open forest areas have a low natural capability to support recreational use, whereas the meltwater channel areas have a medium capability; in other words, the potential recreational areas within the Park are readily susceptible to disturbance and damage.

Because of the generally low capability of the terrain at the Cypress Hills to support recreational use, strict control of the design of recreational facilities and activities must be exercised if the various sites are to be suitable for use on a sustained-yield basis.

Table 22

Site Capability Rating System

Factors		
Climate	(1) Degree days above 43° F (1 - 4)	___
	(2) Mean annual water deficit (2 - 8)	+ ___
Vegetation	(3) Shrub cover (1 - 8)	+ ___
	(4) Grass cover (1 - 8)	+ ___
	(5) Depth of rooting (0 - 8)	+ ___
Topography	(6) Slope and total ground cover (0 - 8)	+ ___
Soil	(7) Thickness of the Ah soil horizon (2 - 8)	+ ___
	(8) Thickness of the forest floor (1 - 4)	+ ___
		sub
	(9) Soil texture and drainage (0 - 1)	X ___
		TOTAL

Capability Rating		
0	Not recommended	___
7 - 20	Very low	___
21 - 30	Low	___
31 - 40	Medium	___
41 - 56	High	___

* After Lesko

Table 23

Site Capability Survey

Factors	Plateau	Open Forest	Meltwater Channel
Degree days	3 *	3	3
Water deficit	6	4	4
Shrub cover	2	1	2
Grass cover	4	4	6
Depth of rooting	4	2	8
Slope	8	8	8
Thickness of Ah	8	6	8
Thickness of LFH	1	2	1
	36	30	40
Soil Properties	x 0.8	x 1	x 1
	29	30	40
Capability Rating	Low	Low	Medium

* See Appendix 8 for details of numerical rating scale and survey data.

DESIGN CRITERIA

Some of the numerous design alternatives listed in Table 24 indicate the many approaches which can be used to ensure high quality recreation sites.

Table 24

Design Alternatives

(1)	Low-Density Development
(2)	Dispersed Sites
(3)	Scaled Parking
(4)	Vehicle Control
(5)	Rotation
(6)	Surfacing
(7)	Use-Definition
(8)	"Leave no Trace"
(9)	"Frictions"
(10)	Satellite Facilities
(11)	Education/Enforcement

Low Density Development

One means of reducing the wear and tear on a site is to utilize low-density development criteria. The present campground densities within the park range as high as 13 units per acre (Ferguson Hill Campground) where four to six would be appropriate; clearly serious site damage is inevitable unless such campgrounds are artificially maintained.

Dispersed Sites

If low-density design standards are utilized, the overall capacity of the Park can be maintained by the utilization of scattered, but more numerous, small sites throughout the Park. Many such prospective sites occur within the Park, for example, the open terraces and open forest areas along the plateau escarpment (Photographs 49 and 50). Such sites would be especially suited to walk-in tent camping.

Scaled Parking

To encourage compliance with design standards at various sites, parking facilities can be scaled to handle only the number of vehicles/parties desired. This approach would be integral to the walk-in camping concept and could be handled in that context by small turnouts along the main road.

Vehicle Control

Much of the disturbance and damage in campgrounds and picnic areas is caused by the practice of allowing people to drive directly into the site. This could be alleviated by emphasizing walk-in camping and picnicking, and providing scaled parking adjacent to the area. The Nichol Spring Campground has suffered severe damage from vehicle traffic on the tight, U-shaped roadway through the site. The Marina-B picnic areas have also suffered widespread disturbance and localized damage from spurious vehicle traffic through the site (Photograph 51).

Rotation

By providing alternative sites, for example, campground A1 and A2, where only one would be available for use, the second site can lie fallow and be allowed to regenerate. Moving tables within a picnic area can achieve the same results.

Surfacing

Where use exceeds the natural capability of the terrain, such as around pedestal stoves or water faucets (Photograph 52), or where the natural resilience is especially low, such as near ground water seepage areas or on steep slopes, the durability of the land can be augmented by various means. Surfacing relates to the various types of reinforcing such as hardtop, boardwalks, gravel pads, etc.; broadly interpreted, it also includes articial maintenance of a site through seeding, fertilization, and irrigation.

Use-Definition

Much abuse of campgrounds and picnic areas results from poor definition of the various uses. The Battle Creek Campground is threatened by an undefined roadway and parking area which is ramifying to all portions of the site. Similarly, the area around Nichol Spring has been devastated by allowing people and vehicles to have access to the spring via the steep slope to the south (Photograph 53).

"Leave No Trace"

Presently this approach is utilized primarily in river recreation,

Photo 47. Bare soil and soil compaction, Elkwater Campground.

Photo 48. Exposed roots and rocks, Nichol Spring Campground.

Photo 49. Prospective open terrace walk-in campsite along plateau escarpment, Upper Graburn Creek watershed. Note outcrop of Cypress Hills Formation.

Photo 50. Prospective open forest walk-in campsite near plateau escarpment, Upper Mitchell Creek.

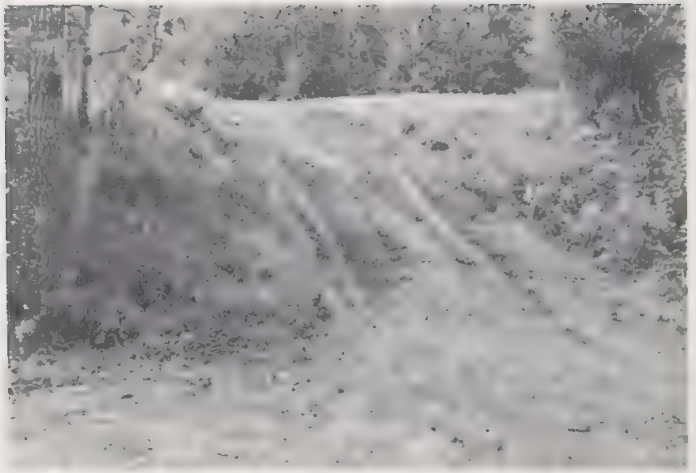


Photo 51. Unauthorized access road to picnic site, Marina-B area. Note steep slope and bare soil erosion problem.

Photo 52. Bare and compacted soil around pedestal stove, Reesor Lake Campground.

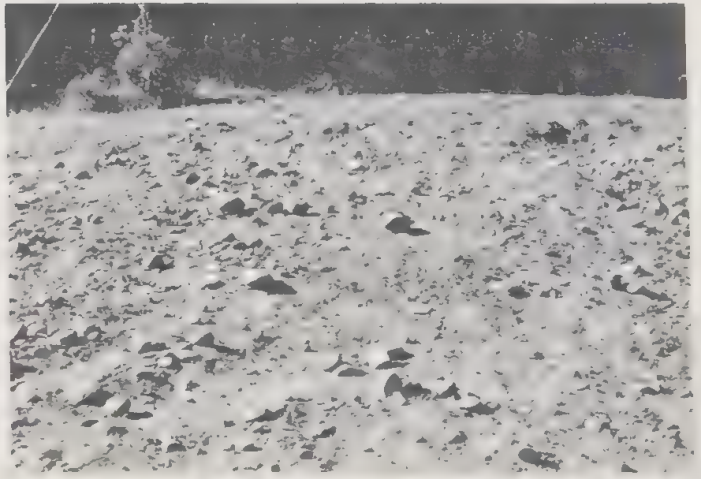


Photo 53. Devastated slope adjacent to Nichol Spring. Note slope of 20 to 25 per cent.

such as at Grand Canyon, where outfitters are required to carry out all trash and to restore all campsites. It is also being accepted in the hiking and backpacking context ("You packed it in, you pack it out.") Here the emerging interpretation also includes removing all traces of use such as campfires and shelters. It is appropriate in wilderness-type zones.

"Frictions"

By making park facilities more convenient and accessible, the atmosphere and use of a park gradually shifts to a more urban and less nature-oriented focus. The use of frictions means purposely leaving the park less convenient and less accessible to preserve its distinctly non-urban character, and to encourage more nature-involvement type activities. Emphasizing shortwalk camping rather than serviced campgrounds is one example of shifting the park emphasis to nature-oriented outdoor recreation.

Satellite Facilities

In attempting to minimize the impact on the landscape of the park, development by private developers of campgrounds outside of the park boundaries is a desirable objective. One very attractive area for this approach is along the eastward continuation of the Elkwater Lake meltwater channel past the rodeo grounds (Photograph 54).

Education/Enforcement

All the above approaches could be utilized; their success, in part, would depend on an education program to clarify the reasons for their use and when necessary, strict enforcement. Enforcement of the parallel parking regulations in the west Elkwater Lake picnic area is appropriate to curtail the present destructive practice of driving alongside the picnic tables.

Summary

On the basis of physical capability considerations, those areas assessed as being "suitable" for recreational use have slight to moderate limitations affecting such use imposed by physical criteria. Limitation-producing factors such as dryness and low vegetative cover, are controlled primarily by the climatic and edaphic conditions of the Hills, that is, the inherent character of the ecosystem. Limitation-producing factors such as depth of rooting and thickness of the litter cover, however, are strongly influenced by present land-uses. For example, the depth of rooting of the fescue grassland, which could reach to about four feet, has been reduced to about two feet by the affects of heavy grazing; also, the LFH layer has been virtually eliminated. All these factors contribute to a recreational setting with a low natural resilience. Under such conditions, another limitation-producing factor, slopes, becomes increasingly significant with use of slopes greater than about ten per cent inadvisable because of high potential soil erodability (Photographs 55 and 56).

By recognizing these considerations, the limitations can be overcome with proper design and management. In recommending new facilities and activities in this study, the various design alternatives identified in Table 7, will be utilized as appropriate. For existing sites where various degrees of disturbance and damage prevail, Table 25 characterizes the condition of the site and indicates appropriate improvement measures.

Photo 54. Prospective area for satellite campground, Elkwater Lake meltwater channel.

Photo 56. Potential erosion and siltation problem, northwest shoreline of Reesor Lake. Note slope of 20 to 25 per cent.

Photo 55. Exposed roots and rocks, Spruce Coulee Campground. Note slope of 20 to 25 per cent.

Table 25

Evaluation of Existing Sites

Site	Condition *	Improvement Measure #
Campgrounds		
Battle Creek	Good	2, 5
Beaver Creek	Good	1
Elkwater	Good	1, 4
Ferguson Hill	Poor	1, 4
Graburn	Very Poor	Close
Lodge Pole	Fair	1, 4
Nichol Spring	Very Poor	Close
Overflow	Fair	2, 3
Reesor Lake	Good	1, 4
Spruce Coulee	Very Poor	Close
Picnic Areas		
Ferguson Hill	Fair	5
Graburn	Fair	5
Marina-B	Fair	2, 5
Elkwater Lake	Good	2, 5
Reesor Lake (side)	Fair	Close

* Good - localized disturbance
Fair - widespread disturbance
Poor - localized damage
Very Poor - widespread damage

#1 - low-density development
2 - vehicle control
3 - rotation
4 - surfacing
5 - use-definition

CHARACTERISTICS

POPULATION

BUILDING CONDITIONS

TOWNSCAPE

FINANCE

DEVELOPMENT EVALUATION

SUMMARY

● ELKWATER TOWNSITE

CHARACTERISTICS

Location

Elkwater Townsite is located on the northern boundary of Cypress Hills Provincial Park, approximately 40 miles south of Medicine Hat, and 220 miles southeast of Calgary.

The Trans-Canada Highway passes some 20 miles to the north, and Highway No. 48 passes approximately 1/2 mile to the northeast. Most people visiting the Park enter the townsite and thus gain their initial experience of Cypress Hills Provincial Park from Elkwater.

Growth and Development

The history of Elkwater Lake, both as a resort area and townsite, appears to have started about 1911 or 1912. The Federal Government, which previously had been administrating the area as a forest reserve, had a small townsite surveyed. Additional lots to the west were surveyed by a Percy Shute.

The townsite developed as an area of summer homes catering to people living in the nearby centre of Medicine Hat as well as other small communities within close proximity. There has apparently never been any attempt to discourage the development of accommodation and service facilities within the townsite and the first store appeared in Elkwater about 1919.

This store provided the much needed convenience of a local general store, since up until then people had to bring their own provisions in over roads that were poor, and sometimes impassable in rainy weather.

At one point in the history of the townsite, there were three stores operating at once, two seasonal, and one a year-round operation to serve the increasing permanent population.

Because of the permanent population and the increasing numbers of children, a school was built about 1938, but burned down in 1946-47. As a result, a new combined school and teachers' residence was erected on the site and history indicates that there were 22 students in the 1947-48 school year.

Since that time, development has included permanent homes, a motel, service station and restaurant, community centre, and curling rink. A piped water distribution system was installed in 1966, to service all the townsite development, and a sewage collection system as well, to service the government buildings and campgrounds. All other development is serviced by individual septic systems or pit privies.

Land Use

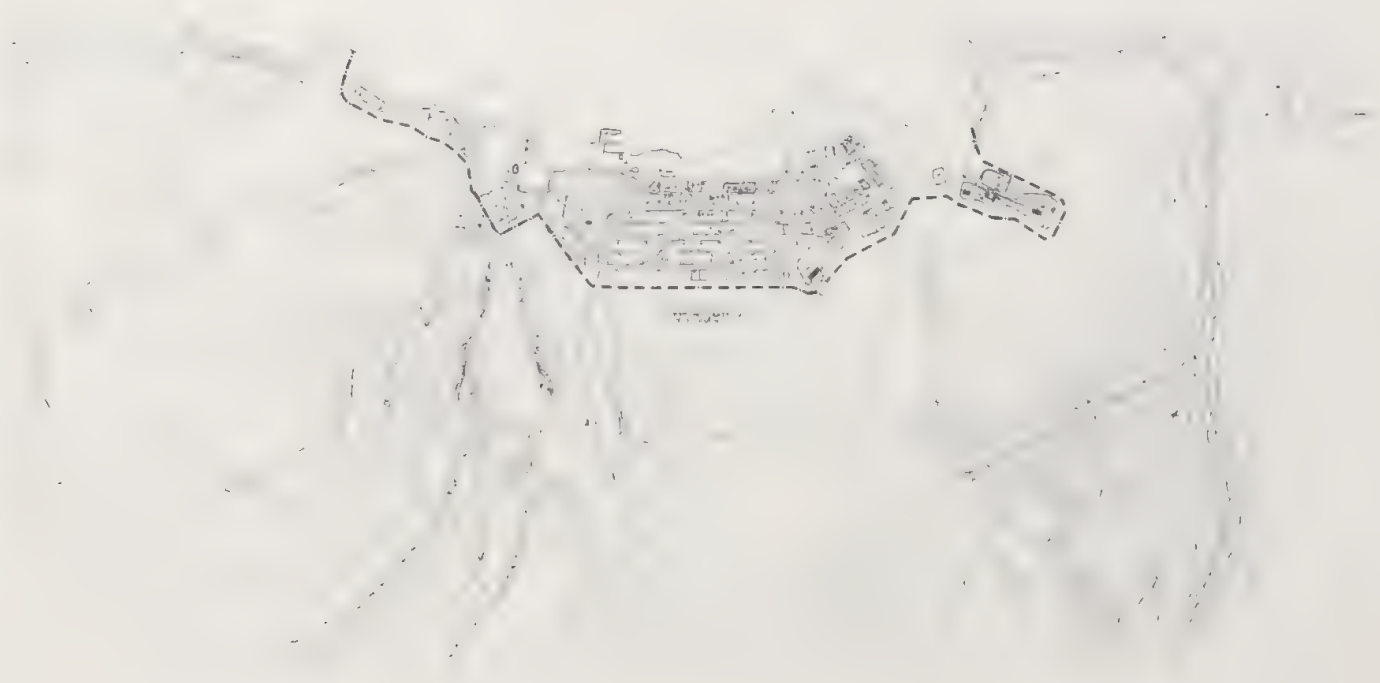
The general location of the various land uses within the developed area of Elkwater, is shown on the accompanying land-use maps of the townsite and environs (Maps 29 and 30).

Seasonal accommodation uses in the form of summer cottages occupy the majority of the total developed area within the townsite, while areas devoted to day-use activities and visitor services appear quite insignificant.

Townsite Infrastructure

Summer Cottages

The majority of summer cottages would appear to have been constructed in the mid-1940's to mid-1950's, and the majority seem to be in more than adequate condition. All summer cottage lots are owned by the Province of Alberta, and were leased to the occupant for a 20-year term, up until 1964.



north

LEGEND

GENERALIZED LAND USE
ELKWATER TOWNSITE

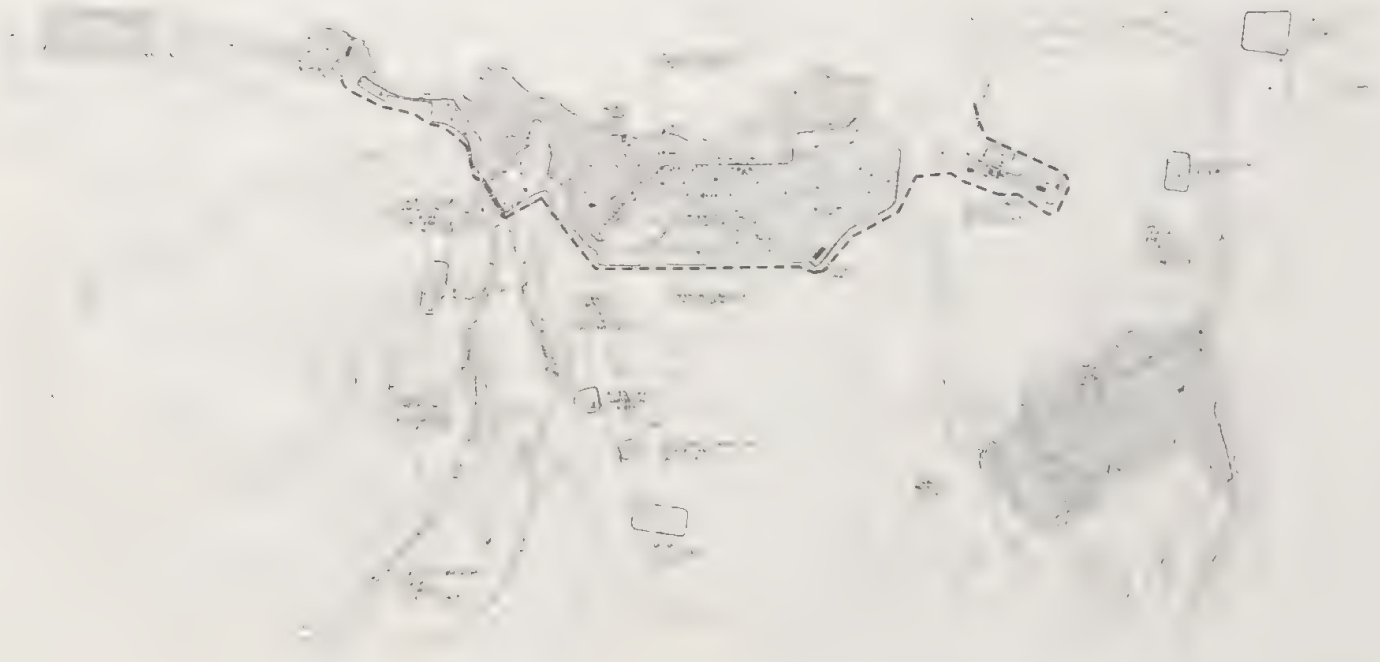
29

CYPRESS HILLS PROVINCIAL PARK
Alberta

RESOURCE INVENTORY ANALYSIS AND CONCEPTUAL PLANNING

Lombard North Group

MARSHALL MACKLIN MONAGHAN LTD



north

LEGEND

ELKWATER EXISTING LAND USE PLAN

30

CYPRESS HILLS PROVINCIAL PARK

Alberta

RESOURCE INVENTORY, ANALYSIS AND CONCEPTUAL PLANNING

Lombard North Group

MARSHALL MACKLIN MONAGHAN LTD

Since 1964, leases have been renewed or granted on a 10-year basis only, the latest being renewed in January of 1973. As indicated in Table 26 below, all of the present leases will have expired by 1984, many of them before 1981.

Table 26

Lease Expiration Schedule

(Summer Cottages, Elkwater)

Date of Expiry	No. of Properties	Percentage
1973 - 1975	26	11.5
1976 - 1978	16	7.1
1979 - 1981	118	52.4
1982 - 1984	65	29.0
TOTAL	225	100.0

Leases for cottages have been issued predominantly to residents of southeast Alberta, with almost 83% of the cottagers coming from within a 30-mile radius of Elkwater Lake, 75% from Medicine Hat. Only four are held by residents of other provinces and none by U.S. residents. Analysis of the residence of cottage lessees is described in Table 27.

Table 27

Lessee Profile

(Summer Cottagers, Elkwater)

Residence	No. of Properties	Percentages
Medicine Hat	170	75.6
Local Municipalities (within 30-mile radius)	28	12.4
Calgary	9	4.0
Elsewhere in Alberta	14	6.2
Saskatchewan	2	0.9
British Columbia	2	0.9
TOTAL	225	100.0

Permanent Residences

There are some 26 permanent residences within the townsite, ranging from good to very good condition. These dwellings are scattered throughout the developed area, with the exception of a grouping of about 9 or 10 houses at the intersection of 3rd Street and 6th Avenue.

Originally, leases were only given for seasonal residences, to be occupied between April 1 and October 15. Later, this time period

was apparently dropped out of the leases and a number of cottages were converted and became permanent homes.

As with summer residences, these lots were leased for a 20-year term, up until 1964. Since 1964, leases have been renewed on a 10-year basis, the latest being renewed in January of 1973.

Most of the present leases for the lots containing permanent homes will expire by 1981 with the majority expiring in 1979 (Table 28). (See Appendix 9 for a more detailed breakdown.)

Table 28

Lease Expiration Schedule

(Permanent Homes, Elkwater)

Date of Expiry	No. of Properties
1973 - 1975	1
1976 - 1978	3
1979 - 1981	16
1982 - 1984	6
TOTAL	26

Commercial Facilities

There are four commercial uses in the townsite, two of which are seasonal only, and consist of a hamburger stand in the beach area and a mobile store oriented towards the campgrounds and located in Block 3. The other two commercial uses are more or less year-round operations, and consist of a service station, with a restaurant attached, and a motel with 14 units. There are three housekeeping cabins directly across the road from the motel and which are operated in conjunction with the motel.

Although operation of these commercial uses takes place on a year round basis, they are still primarily oriented towards the transient and/or vacationing public.

Administration and Visitor Services

Government uses include those uses providing a service to visitors such as the information centre, lodge, and amphi-theatre, as well as those necessary for the daily administration of the Park and Townsite needs. These include the administration building, maintenance compound, fire hall, staff apartments, church, and R.C.M.P. cabin.

The administration building is located outside the townsite, adjacent to the maintenance compound and is a new masonry building in excellent condition. This service compound is well-screened from the roadway, and does not intrude into the landscape.

The information office is located at the corner of 1st Street and 4th Avenue, and could be relocated more advantageously elsewhere in the Townsite. The lodge, adjacent to 1st Street, is presently used as a small nature-interpretive centre and gathering area for evening singsongs, while the amphi-theatre is mainly used for evening movies for the campers. The staff apartments are quite new and in excellent condition.

The R.C.M.P. cabin at the corner of Centre Street and 4th Avenue is used primarily during the summer and, then, only on week-ends.

Recreational and Day Use Activities

Recreational and day-use activities are for the most part, located on the periphery of the Townsite and consist of two marinas, one of which includes the beach and change house, a hockey rink which houses the tennis court in the summer, and community hall.

The major boating area located in the Townsite, provides launching facilities and has a maximum capacity of 80 boats with un-organized car parking facilities. This marina appears fully utilized with about 80% of the slips being used by residents of Medicine Hat. The other marina is located to the extreme west end of the developed area and has a capacity for about 12 boats.

The beach and swimming area is small and the quality of the beach sand poor.

Because of its proximity to the marina, the swimming areas are roped off to keep boat traffic out. Although this system appears to work fairly well, there still must be a conflict of activities with respect to oil and gas spillage and exhaust fumes.

The curling rink has natural ice and is reportedly used quite extensively in the winter months. The Community Hall is located on 4th Avenue, and has a membership of about 40 local residents.

POPULATION

The population of Elkwater in 1972, was 1,130 persons of which 1,032 were seasonal residents, and 98 permanent residents.

The permanent population consists primarily of Provincial Park employees, Department of Highways employees, and retired people (with retired people constituting approximately 30% of the permanent population).

Apparently, the percentage of retired persons in the Townsite was much higher in past years, but the lack of medical facilities, as well as the severe winters, have caused a decline in their numbers.

It is reported that doctors in the area attempt to discourage people approaching retirement from settling in remote areas due to the lack of necessary medical facilities and encourage them to retire to areas where they are available.

There are 16 school children in the town, who are bussed to school in Irvine, some 35 miles away.

BUILDING CONDITIONS

A cursory building condition survey was carried out in Elkwater, to determine whether the buildings in the Townsite were in as bad a physical state as they appeared to be on first glance.

Three ratings were used in the survey, these being 'Good', 'Fair', and 'Poor'.

Generally speaking, a building was rated as 'Good', if there appeared to be no structural or functional deficiencies and needed only normal maintenance to stay in this category. This category would include newer homes and cottages and the older well-kept buildings.

The 'Fair' category included buildings which apparently had no structural deficiencies but were in need of minor repairs such as paint and/or siding or were generally deficient in functional qualities such as access or size.

The 'Poor' category included the balance of the buildings and which would generally reflect structural and functional deficiencies as well as poor siting qualities.

A summary of the survey is shown on the Building Condition Map (31). It is interesting to note that although the appearance of the Townsite is generally one of uninteresting buildings, messy, and cluttered yards, and makeshift out-buildings, 92% of all residences appear to be in good or fair condition. As indicated on the map, there is only one block where the physical condition of the buildings appears predominantly poor, that being Block 17 (b). The balance of the poor buildings are dispersed throughout the other Blocks and are overshadowed by the surrounding good buildings or by the fact that they are hidden from view by trees.

TOWNSCAPE

The overall impression one gets upon first entering Elkwater, is that of dwellings with makeshift out-buildings, cluttered yards, and a lack of aesthetic qualities with respect to design or maintenance notwithstanding that the building condition survey indicates that over 90% of the dwellings are physically in fair to good condition.

Although the leases clearly state that, "the lessee may not clear the land of any trees, disturb the surface of the land, nor construct any improvements thereon, without written consent of lessor", (Minister of Lands and Forests), and in addition, "the lessee shall keep the said lands in a clean and attractive condition and may not allow refuse to accumulate on the said lands...", it appears that little regard has been paid to these conditions.

From an examination of a number of dwellings within the townsite, it is fairly evident that with a little judicious forethought in the siting of buildings, the overall appearance of the townsite could have been altered drastically. There are cases where a new and good quality dwelling has been erected on a site, with no regard to existing tree cover, and as a result visually plays a very prominent part in the landscape. On the other hand, there are a number of modest dwellings which have been sited amongst the trees in such a manner that the landscape still remains a desirable visual amenity. There are also dwellings that have been erected on a high hill to capture the view. However, this works in reverse too and, consequently, such dwellings become visible over a much wider area.

The condition and appearance of the yards around many dwellings has a detrimental effect on the overall impression one gets of the townsite as well. Old vehicles, debris, and junk have been allowed to accumulate around the houses and this tends to detract from the general parklike setting. Another factor which proves disastrous to the Park environment is the collection of elk, deer, and moose heads along the front of the Evergreen Motel and which serve as grim reminders of the past exploitation of the Cypress Hills area.

In summary, the townsite is in need of a major face-lifting if it is indeed to fit into and enhance the Park setting.

FINANCE

The operation of Cypress Hills Provincial Park, including Elkwater Townsite, appears primarily dependant on money received from the Provincial Government and/or requisitioned from the Improvement District and which must be requisitioned for by the Park Superintendant.

During 1973, residents of the Townsite paid out an estimated total of $19,332 in rent, water fees, and taxes; the breakdown and disposition of these monies are as follows:

Rent - $6528. to the Dept. of Lands and Forests

Water Fees - $3060. to the Dept. of Lands and Forests

north

LEGEND

BUILDING CONDITION
ELKWATER TOWNSITE

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Taxes - $9744. to the Improvement District.

The Improvement District makes a grant to the Park in order to help cover the costs of providing street lighting, snow-ploughing, and general maintenance. It is the practice of the Improvement District to endeavour to "plough back" 80% of the revenue generated from taxes, into the area which in this case would be $7,795.00. Street lighting is a fixed cost of $1,575.00, leaving a balance of $6,220.00, which the Improvement District ask the Provincial Park authority to requisition. Upon receipt of such a requisition, the Improvement District would process it for payment.

DEVELOPMENT EVALUATION

As part of the information gathering process, and in addition to field surveys and data collection, discussions were held with the Park Superintendent which, together with the inventory, has enabled a general assessment of some of the apparent problems, and which are reviewed below and diagramatically summarized on the Development Problems Map (32).

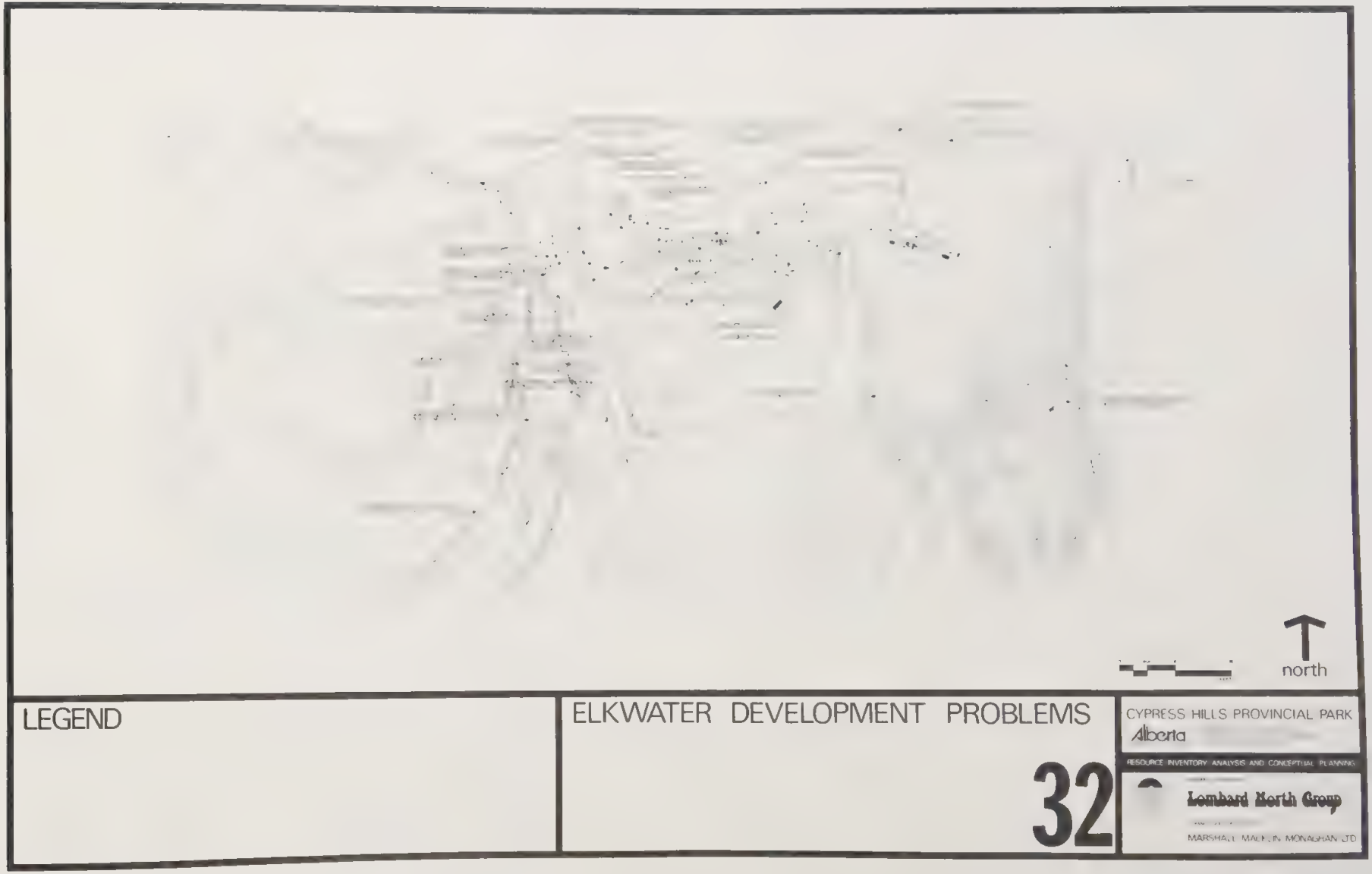
Major Problems

Land Use:

(1) The presence of cottages and homes in a predominately visitor-oriented area containing both day-use and campground facilities.
(2) The lack of an overall design policy (including the siting of buildings and choice of materials) to give an attractive visitor image to the townsite, and one which is befitting to a Provincial Park.
(3) The disorganization of several important land uses, with little evidence of planned grouping of facilities serving similar functions. This is apparent in staff housing, visitor information, and interpretation services, as well as the community hall and curling rink.
(4) The apparent lack of balance in the range of visitor services offered by the existing townsite, and which is most apparent in the lack of stores, accommodations, or commercial services, located in any commercial or business centre.
(5) Pressures from tourists for a liquor outlet in the townsite.
(6) The reported additional administrative problems created by cottages in the areas of essential services (water, sewers, fire protection, policing, and maintenance), as well as the cost to the government of providing their services versus the revenue generated by cottages to pay for such services.

Traffic

(1) Lack of relationship between land use and traffic, and which is most clearly seen in the absence of separate access routes into the different land use areas. This has created a general confusion of traffic and excessive traffic volumes on one or two routes, and at one or two intersections within the townsite.
(2) The relatively high level of traffic congestion at peak periods, especially along 4th Avenue in the areas of Centre Street and Lakeview Drive.
(3) The conflict of pedestrians and vehicles on 4th Avenue and Lakeview Drive. This problem has prompted a request for sidewalks which are to be built from the Elkwater Campground, along Lakeview Drive and 4th Avenue, to the intersection of 4th Avenue and Centre Street.
(4) The lack of an overall pedestrian walkway system linking major visitor attractions to accommodation areas.
(5) The lack of adequate and well defined parking areas to serve visitor service and day use areas. On-street parking prevails throughout the townsite and adds to the traffic congestion in peak periods.



LEGEND

ELKWATER DEVELOPMENT PROBLEMS

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(6) The general lack of adequate geometric design of the roads at numerous locations within the townsite.

SUMMARY

From an examination of the information gathered, both by field survey and by interview with park personnel as well as an examination of information presented in other sections of the overall inventory, various conclusions have been drawn and assumptions made which form the basis for the Conceptual Plan. These are outlined below as follows:

1) Elkwater Townsite was never intended to function as a viable town nor is it likely to function as such in the future.

2) The present Provincial Park policy states that townsites, among other things, are viewed as conflicts within new parks.

3) The generally developed portion of the Townsite now accomodates 1,130 persons on 125 acres, providing a density of nine persons per acre. A fully serviced campground (i.e. piped water eight sewers) would likely have a density of six to eight campsites and assuming four persons per campsite, should accommodate 25 to 30 persons per acre. It is apparent that the presently serviced or serviceable land within the townsite is being enjoyed and controlled by a relatively few people.

4) There is excess capacity in the present sewage facilities to accommodate a population of about 2,000 persons without any major expenditure or additions on the system.

5) There is more than adequate water supply for the foregoing population.

6) Of the 225 cottage properties leased in the townsite, 198 or 88% of the leasees are from within a 30 mile radius of the Park. The townsite is apparently primarily catering to a very local market.

7) Of the total of 251 leases in the townsites, 176 or 70% will have expired by 1981; all by 1984.

8) The proportion of the permanent population consisting of retired persons has declined in the past and if the townsite continues to exist, such population will likely continue to decline in the future.

9) The overall appearance of the townsite does not provide any sort of park-like setting and/or a good "park experience" and would require a major face-lifting to compliment the park.

10) The overall park environment is a very fragile one and can best support dispersed activities, including campgrounds. The townsite is one of the few resistient areas within the Park which could support higher density activities, both from the standpoint of the environment as well as the availability of sanitary conveniences and water supply.

11) A disparity prevails in the reported cost to the government of providing services to the townsite as opposed to the revenue generated by the townsite.

WATER SUPPLY SOURCES

EXTENSION OF WATER SERVICES

WASTE TREATMENT AND PUMPING FACILITIES

SEWER SYSTEM

EXTENSION OF SEWAGE SERVICES

ELECTRICAL POWER

TELEPHONE SYSTEM

● SERVICES

The community of Elkwater is serviced by municipal water and sewage facilities (Maps 33 and 34). The water system services the majority of buildings within the community including permanent residences, cottages and service buildings, the lower camp area, the trailer camp, the picnic grounds, the church camps, the beach houses and the lodge. The sewage system does not service the cottages, but does service the majority of government-owned buildings including private residences, offices, maintenance buildings, beach houses, the apartment building, the motel, the restaurant, the trailer camp, and the lower camp area. An estimate of the population presently being serviced by the Elkwater municipal water and sewage facilities is shown in Table 29.

Table 29

Estimate of Population Equivalent Presently Serviced
By The
Elkwater Municipal Water & Sewage Systems

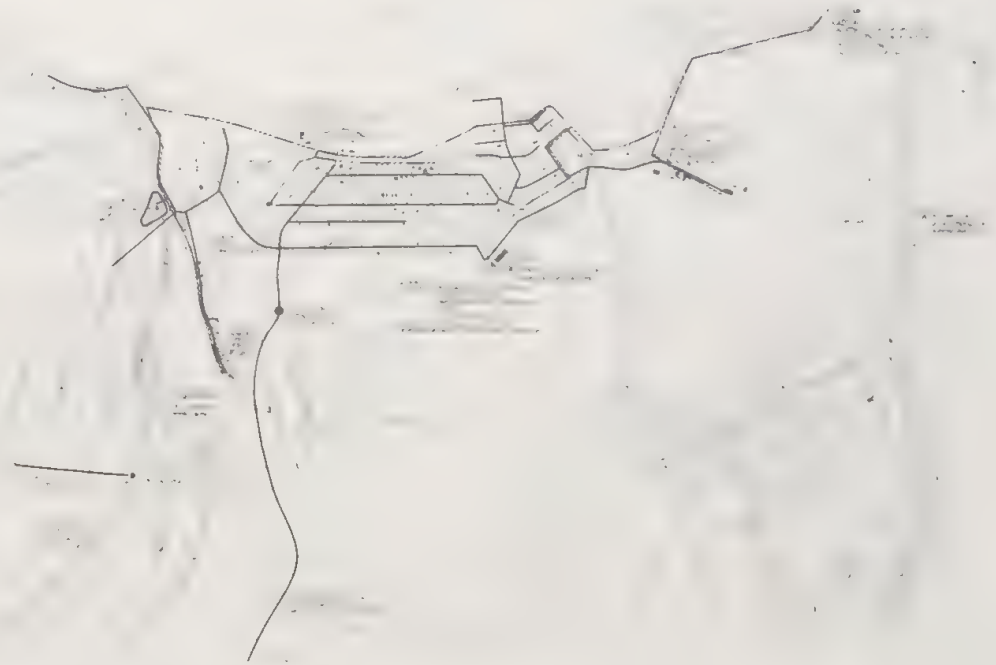
Description	Water	Sewage
Permanent Residence	100 pop. eq.	100 pop. eq.
Cottages	1,000 pop. eq.	0 pop. eq.
Motel	60 pop. eq.	60 pop. eq.
Apartment	20 pop. eq.	20 pop. eq.
Trailer Camp	135 pop. eq.	135 pop. eq.
Lower Camp	385 pop. eq.	385 pop. eq.
Miscellaneous Small Camps (Church, Guides, etc.)	300 pop. eq. (assumed)	0 pop. eq.
*Day Users (peak day)	3,000 pop. eq.	3,000 pop. eq.
Lodge	200 pop. eq. (assumed)	200 pop. eq. (assumed)
Restaurant and Gas Station	200 meals/day (assumed)	200 meals/day (assumed)
TOTAL	5,200 pop. eq.	3,900 pop. eq.

* 1972 Daily Traffic Volume Entering Park by East Access Road
Approximately 2,000 vehicles per day on peak summer weekends.
Approximately 45% day users.
For 4 persons per car, weekend day use = 3,600 population.
Assume 3,000 pop. go to Elkwater Townsite.

NOTE: Unknown and unaccounted for except for Lodge estimate are people camping in outlying campgrounds, who use Elkwater Townsite water and sewage facilities while at beach or other townsite attractions.

WATER SUPPLY SOURCES

In the past, water was obtained from Mitchell Spring located approximately 1-1/2 miles south of the townsite. As demand increased, this spring rated at a maximum flow of 30 gpm was augmented, as required, from a pump located in Mitchell Creek which flows through the lower camp area. This rather temporary pumping installation which includes filtration and chlorination facilities, is capable of delivering up to 60 gpm to the water storage reservoir. Flow in the stream together with the pumping arrangement generally limit the discharge from this source to approximately 30 gpm during the summer. Two wells #1 and #2 located near the centre of the townsite have been in existance for a number of years, each capable of approximately 20 gpm. However, due to a high iron content of approximately 4.5 ppm. in both wells and serious



north

LEGEND

ELKWATER SERVICES INVENTORY

33

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RESOURCE INVENTORY ANALYSIS AND CONCEPTUAL PLANNING

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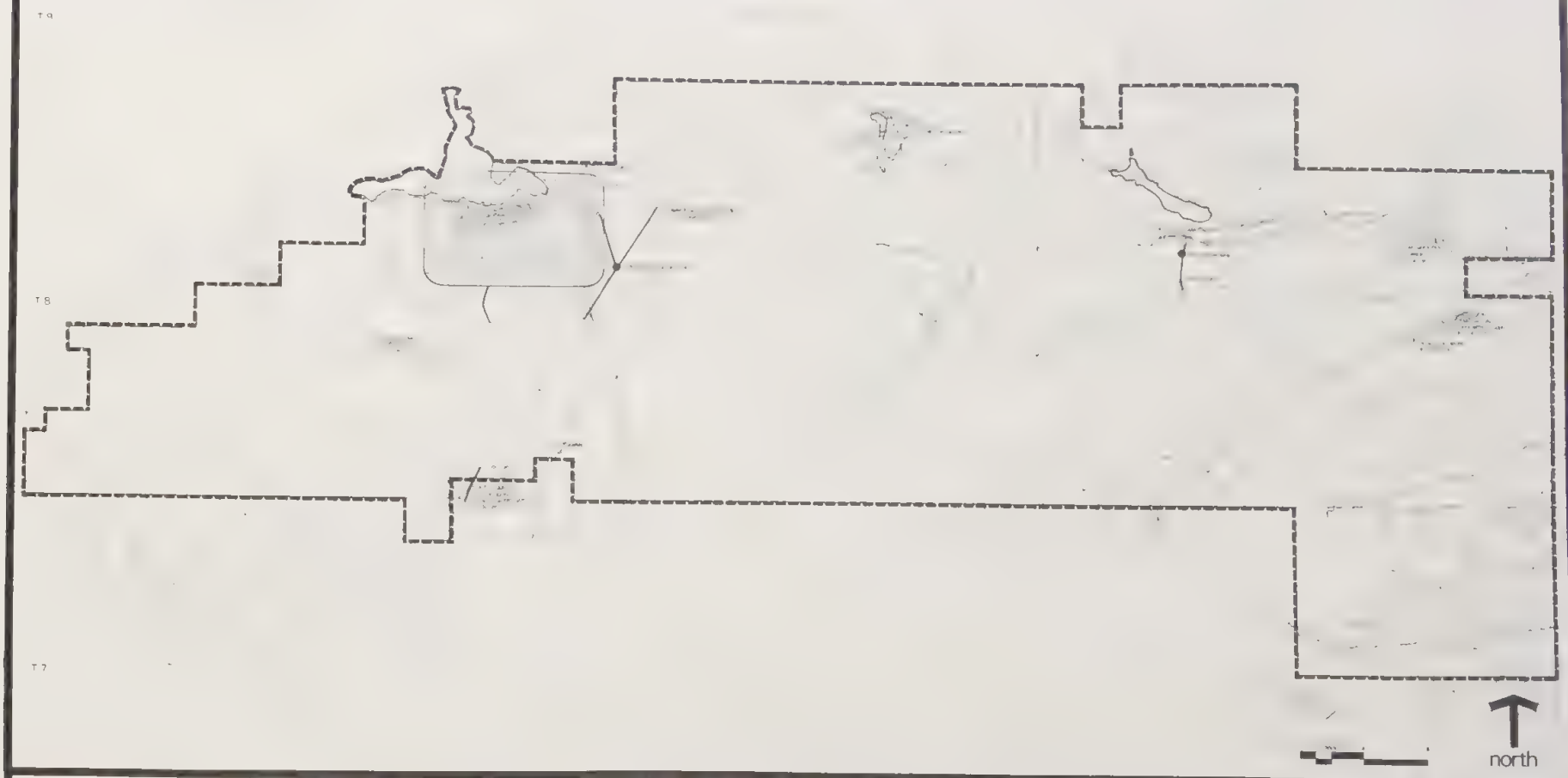

LEGEND

PARK SERVICES INVENTORY

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CYPRESS HILLS PROVINCIAL PARK

Alberta

RESOURCE INVENTORY, ANALYSIS AND CONCEPTUAL PLANNING

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surface leakage into Well #2, the wells are not used except in emergencies.

During the spring of 1973, test drilling was carried out to the southeast of the community in order to establish an additional, much-needed water supply source. It is probable that an additional perennial supply of at least 40 gpm will be available from this source. Pumps were placed in one of the test wells for connection to the system during the summer of 1973. Following the summer pumping period, during which time the test wells will be observed, a report is to be prepared by Hydrogeological Consultants of Edmonton on the possible long-term yields of the aquifer. A summary of water sources, their estimated capacities, and a rough estimate of existing water demand, are shown in Table 30.

Table 30

Summary of the Existing Water Supply & Water Demand

Estimated Supply

Source	Estimated Capacity
Town Spring	30 gpm (maximum)
Creek	30 - 60 gpm (unreliable, poor quality)
Well No. 1 & 2	40 gpm (requires iron removal)
New Townsite Well	40 gpm (unproven)
TOTAL	140-170 gpm
	or approximately
	200,000 - 245,000 gallons per day

Standpipe Capacity - 200,000 gallons

Assumed Demand

Description	No.	Daily Per Capita Water Consumption	Average Daily Demand
Permanent Residents	100	80 gal.	8,000 gal.
Cottagers	1,000	50 gal.	50,000 gal.
Motel	60	30 gal.	1,800 gal.
Apartment	20	50 gal.	1,000 gal.
Trailer Camp	135	30 gal.	4,000 gal.
Lower Camp	385	30 gal.	11,500 gal.
Miscellaneous Small Camps	300	20 gal.	6,000 gal.
Day Users	3,000	10 gal.	30,000 gal.
Lodge	200	10 gal.	2,000 gal.
Restaurant and Gas Station	200 meals/day	5 gal/meal	1,000 gal.
TOTAL			115,300 gal.

Average Daily Summer Weekend Flow, say 115,000 gals./day.
Assume a peaking factor of 1.5 for peak day,
Peak Day Flow = 164,000 gals./day.

NOTE: Supply should be capable of meeting peak day flow.

A long history of bacteriological contamination of the municipal water system exists. Both the spring source and the creek source are readily subject to contamination and should receive continual chlorination when in use. The creek source should only be considered as an emergency source of supply and should not normally be used. The water from Wells #1 and 2 also cannot be considered as a suitable source of water unless iron removal equipment is installed.

Thus there appears to be more than sufficient ground water available to service the existing demand in the Elkwater townsite. However, four or five different sources are used to supply this demand with two of the sources (Mitchell Creek and Wells #1 and #2) requiring treatment facilities and another source (the new well) not yet proven.

Should the investigations presently underway by Hydrogeological Consultants Limited indicate that sufficient quantities of satisfactory water can be obtained without treatment within the townsite, it would likely be more feasible to utilize such sources even if new wells must be developed than to install treatment facilities on the existing wells or treat water from the lake or creek.

EXTENSION OF WATER SERVICES

Low water pressure problems presently exist in some of the higher elevated areas presently serviced, notably the cottages along 7th Avenue. This is particularly so during periods of high use on holiday weekends when the water level in the tank is drawn down significantly below its top water level elevation of 273 feet. Even if additional supplies are made available and the storage tank enlarged, areas above an elevation of approximately 170 to 180 feet, could not be adequately serviced without booster pumping.

A detailed hydraulic network analysis of the distribution system has not been carried out to determine the capability of the existing water mains to service development beyond their existing limits. Should it be deemed desirable to service significant additional development from the Elkwater system, a much more detailed analysis of the present system will be required.

WASTE TREATMENT & PUMPING FACILITIES

All cottages within the townsite are serviced by individual septic tank-tile bed systems. It is reported by Park personnel that some of these systems are not functioning adequately. However, since most cottages are relatively long distances from Elkwater Lake, it is unlikely that the lake is being significantly polluted from these sources.

The waste from the buildings and camps connected to the sewer system (Table 27) is treated in a two-cell waste stabilization pond, having a total surface area of approximately five acres. Such a pond is capable of providing 80 to 90 per cent removal (secondary treatment) of biochemical oxygen demand and suspended solids on a year-round basis (permanent population) for approximately 500 people. During the summer months when conditions are more favourable for the natural treatment processes involved, the five-acre facility could handle the wastes from upwards to approximately 1,500 people continually and up to 2,000 to 2,500 people on a short-term (one to two day) basis if the average loading was not exceeded.

The main pumping station which handles all flow from the townsite is capable of handling on a year-round basis (permanent population) the waste flow from more than 2,000 people. Table 31 summarizes the design capacity of the waste stabilization ponds and pumping stations and estimates their present usage based on 90 per cent of the assumed water use values for the connected users as shown in Tables 29 and 30.

Table 31

Summary of the Design Capacity and Estimated Usage
of Existing Waste Pumping & Treatment Facilities

Design Capacity

Waste Stabilization Pond	- 2 cells each approximately 2.5 acres
Winter treatment capacity	- average approximately 50,000 gpd normal domestic sewage
Summer treatment capacity	- average approximately 150,000 gpd normal domestic sewage
Main Sewage Pumping Station	- 2 - 450 gpm (650,000 gpd) pumps, 1 duty, 1 standby, allowing for a peaking factor of 3 - design capacity 215,000 gpd.
4th Avenue Pumping Station	- 2 - 400 gpm (580,000 gpd) pumps, 1 duty, 1 standby, allowing for a peaking factor of 3 - design capacity 190,000 gpd.

Estimated Usage

Description	No.	Daily Per Capita Water Consumption	Average Daily* Sewage Flow
Permanent Residents	100	80 gal.	7,200 gal.
Motel	60	30 gal.	1,700 gal.
Apartment	20	50 gal.	900 gal.
Trailer Camp	135	30 gal.	3,600 gal.
Lower Camp	385	30 gal.	10,400 gal.
Day Users	3,000	10 gal.	27,000 gal.
Lodge	200	10 gal.	1,800 gal.
Restaurant	200 meals/day	5 gal/meal	900 gal.
TOTAL			53,500 gal.

Average daily summer weekend flow, say 53,500 gallons.
* Based on 90% of Water Use, Table 28.

SEWER SYSTEM

Detailed hydraulic calculations were not carried out to determine the capacity of the existing sewers and force mains. However, if the sewers and force mains were sized in accordance with the pumping stations, as would seem reasonable, there would appear to be excess capacity in the existing sewer system.

EXTENSION OF SEWAGE SERVICES

It appears that significant excess capacity exists in the sewage system. During the peak summer periods (1972), it is estimated that the system was being loaded at less than half its design capacity.

Sewage services could readily be extended to the existing cottages to solve problems which reportedly exist with many of their individual septic tank-tile bed disposal systems. Alternately, and to a limited degree in addition to, sewage service could be extended to some of the outlying campgrounds such as Ferguson Hill, Lodge Pole, etc.

ELECTRICAL POWER (Maps 35 and 36)

The Park and townsite are supplied with electricity from Medicine Hat by overhead line of unknown capacity of 14,000 volts, single phase.

The townsite is serviced by "back lot" distribution. A branch feeder services farms to the northwest of the Park. The route shown on the overlay is deduced and no physical evidence exists on the data studied to verify the route shown.

The branch feeder to the south along Highway #48 which branches to the west to service two farms, is also deduced from the Calgary Power Data. The route shown is not provable and no evidence exists on the data studied to verify its geographical route.

Single phase power is suitable only for domestic loads. Any development of the Park utilizing large motor loads must provide for three phase power and a detailed study is required to establish requirements.

It appears, however, that the provision of electrical power for small power uses to the west such as comfort stations requires only extension from existing lines.

Power for small uses to the north in the area of Spruce Coulee Reservoir, is apparently available by extending the feeder from "Armstrongs" farm.

The Elkwater community distribution system is considered aesthetically unacceptable for a park community. The new feeders to St. Pauls Camp and the Catholic Church Camp, are already underground. It is not clear why the underground feeder through the community is proposed in the location indicated. The distribution system requires complete study to evaluate long term improvement alternatives.

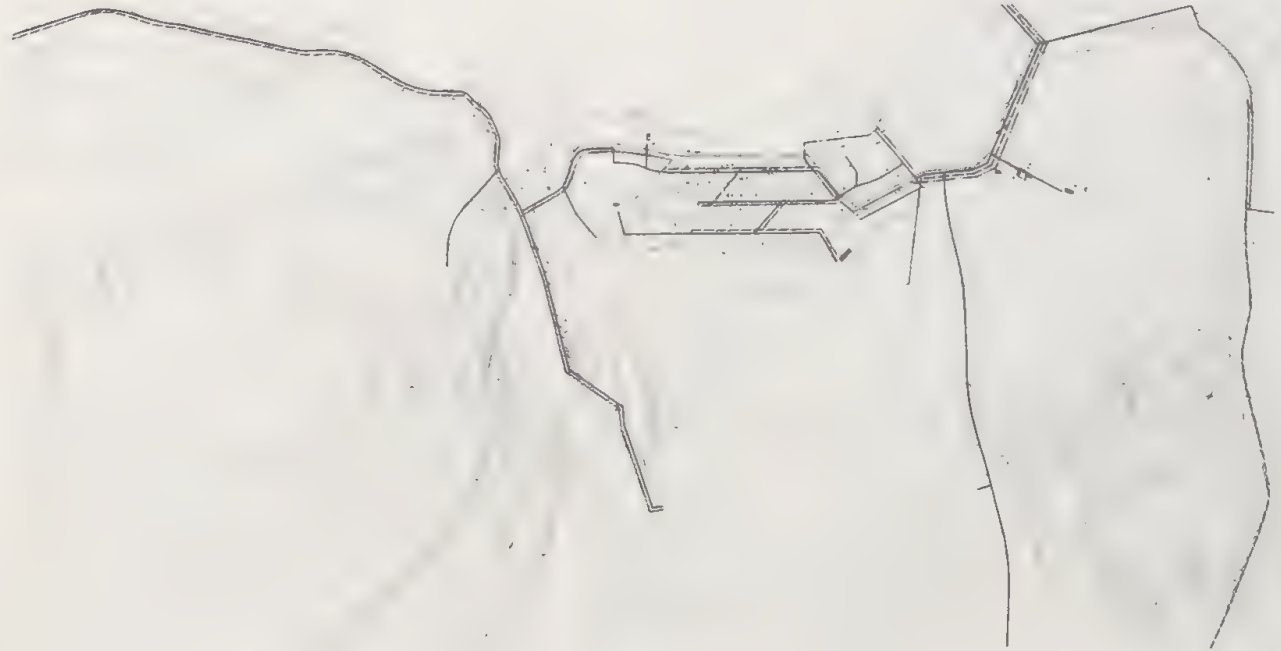
TELEPHONE SYSTEM

The study indicates that the telephone communication is basically adequate for the Park and it will require only extension to future developments.

In the community itself, it is already underground, although the incoming trunk lines on 8th Avenue will require relocation in accordance with plans to be developed for the power system.

The information used in this preliminary report is obtained from studies of distribution systems provided by Calgary Power Company and the Alberta Government Telephone System.

The information available is schematic in form with the schematic data physically related in a general sense to the geographical routing. As long as the data shown on the overlays is used for assessing the potential of present facilities, the information is adequate. However, before any major decisions are made an accurate field check must be made.



north

LEGEND

ELKWATER POWER AND TELEPHONE DISTRIBUTION

35

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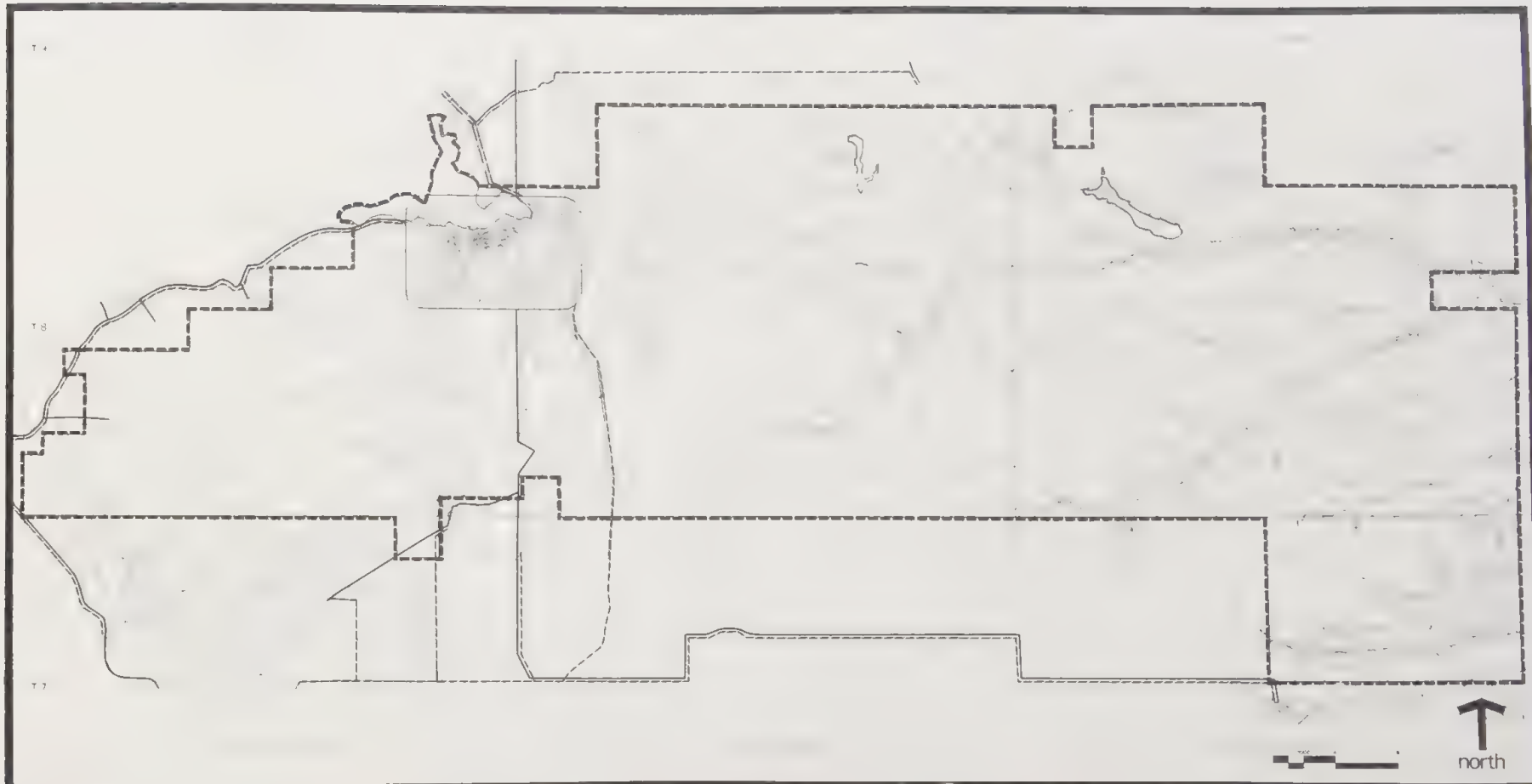

LEGEND

PARK POWER AND TELEPHONE DISTRIBUTION

36

CYPRESS HILLS PROVINCIAL PARK

Alberta

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USER DATA

PAST TRENDS

PARK USER INFORMATION

ECONOMIC BENEFITS

DEMAND FORECASTS

● *USER DATA*

The data used in this section have been provided by the Parks Branch, Province of Alberta, except where noted. It should be mentioned at the outset that there are several anomalies and inconsistencies in the data. In some cases the sample sizes are very small. For these reasons a certain amount of care is required in using the mentioned data.

PAST TRENDS

Provincial Perspective

Tourism, in general, and park use and attendance in particular, have been steadily increasing both in Alberta and nationally. The higher demand for recreation facilities is a result of such factors as higher disposable incomes, more leisure time, an increasing interest in the environment, and a general feeling of wanting to escape the urban centres.

In 1971 tourism receipts for all of Canada totalled $3,807,106,000. This is broken down as follows.:

Domestic trips (25 - 99 miles from origin)	26.0%
Domestic trips (100 miles or more from origin)	40.3%
Foreign visitors	33.7%

This value resulted from some 156,000,000 person-trips, 54.8 per cent of which were domestic trips 25 - 99 miles and 20.2 per cent were 100 miles or more domestic trips. Expenditures for these trips were $989,000,000 and $1,535,000,000 respectively in Canada.

In Alberta, receipts for tourism from trips by Canadians exceeded $240,000,000. Approximately $75,000,000 (31 per cent) was from domestic trips 25 - 99 miles while the remainder (69 per cent) or $165,000,000 was from domestic trips greater than 100 miles.

Table 32 illustrates recent growth in visitors and expenditures in Alberta from 1966 to 1971.

A point to be noted when comparing these figures is that 1971 was characterized by a much higher unemployment rate than was 1966. The effect can be noted in Table 33 when visitation in Cypress Hills decreased following a pattern of increasing visitation.

Below is a break-down of the origins of visitors to Alberta for 1971 and 1966.

Table 32

Comparison of 1966 and 1971 Visitor Surveys

	1971	1966	Aggregate % Increase	Annual % Increase
Total Parties	405,200	393,600	2.9	0.6
Total Persons	1,158,100	1,125,000	3.0	0.6
Average Persons/ Party	2.86	2.86	-	-
Total Expenditures	$60,557,000	$39,000,000	55.3	9.2
Average Expenditure/Party	149	99	50.5	8.5
Average Expenditure/Person	52	35	48.6	8.2
Average Expenditure/Party/Day	29	20	45.0	7.7

Table 33

Origin of Visitors

Origin	1971 Parties	%	1966 Parties	%
British Columbia	113,300	28.0	98,800	25.1
Saskatchewan	60,400	14.9	66,800	17.0
Other Canada	83,200	20.5	87,600	22.2
U.S.A.	140,300	34.6	135,000	34.3
Other	6,300	1.6	5,400	1.4
Unknown	1,700	0.4	---	--
TOTAL:	405,200	100.0	393,600	100.0

Over 82 per cent of these people come on vacation and pleasure trips. The remainder were on business and other assorted trips.

Table 34 illustrates their total expenditures in these two years.

Table 34

Expenditures by Visitors

Origin	1971 Total Expenditures	%	Average per party	1966 Total Expenditures	%	Average per party
Canadian	34,639,000	57.2	$135.00	24,000,000	61.5	$ 95.00
American	25,252,000	41.7	180.00	14,000,000	36.0	104.00
Other	666,000	1.1	83.00	1,000,000	2.5	98.00
TOTAL	60,557,000	100	$149.00	39,000,000	100	$ 98.00

Cypress Hills Park

Cypress Hills Park is the most heavily used provincial park in Alberta. The following attendance figures (Table 35) for the Park are taken from the Patronage reports, 1965 - 1972.

Table 35

Attendance at Cypress Hills Park

			Per cent Change Over Previous Year
Jan. - Dec.	1972	626,409	- 5.3
Jan. - Dec.	1971	661,211	- 7.0
Jan. - Dec.	1970	710,498	+ 5.0

Table 35 continued

			Per cent Change Over Previous Year
Jan. - Dec.	1969	676,723	+14.2
Jan. - Dec.	1968	592,358	+ 8.7
Jan. - Dec.	1967	545,062	-20.7
Jan. - Dec.	1966	687,089	+16.0*
May - Dec.	1965	570,920	

* On a May - Dec. pro rata basis.

Data available indicates wide fluctuations in attendance over the seven year period reported on the previous page.

It should be noted that visitation trends previous to 1971 were upward.

The decrease noted in 1967 is a reflection of the common phenomena in park attendance patterns in Western Canada as large numbers of persons travelled to Quebec to attend Expo. Recent decreases in park attendance may be a reflection of a change in visitor reporting methods, or, given the established patterns of resource use in the park, the facilities may be utilized to their capacity. Available data is inadequate to analyse visitation patterns in depth.

PARK USER INFORMATION

The following tables and discussions provide information on the users, their activities, equipment, and socio-economic background.

While the information gathered in a particular year may be accurate there appears to be inadequate consistency of information collection. It is thus difficult to compile a user profile completely valid for a lengthy period and to accurately examine the trends in park use. However, the available data does provide an outline of the characteristics of the park users and the principal activities engaged in.

Origin of Visitors

Cypress Hills is used by a large number of residents from Medicine Hat. In 1967, 33 per cent of the park users were from Medicine Hat with another 40 per cent coming from the rest of Alberta. These figures can be compared to a survey undertaken in 1970 (in association with CORDS) and shown in Table 36. American visitors were not included.

Table 36

1970 Survey of Park Users - Origin

Origin by Province	% Distribution
Nova Scotia	0.15
Quebec	0.15
Ontario	1.91
Manitoba	1.17
Saskatchewan	5.27
Alberta	89.0
British Columbia	2.20
Yukon	0.15
Sample Size 682	

In this later survey, a larger percentage of users in the sample came from Alberta, but the American users were excluded. Table 31 gives the percentage of American travellers to Alberta as a whole. Within the townsite of Elkwater, approximately 89 per cent of the people owning cottages live within 30 miles of the Park. Residents of Medicine Hat account for 75 per cent of the cottage owners.

Characteristics of Visits

Of all the visitors to Cypress Hills 45 per cent came for one day outings, while the remaining 55 per cent came for one or more nights. Slightly over 40 per cent of the visitors came during their annual vacations. Nearly 60 per cent came during times other than their vacation, such as on weekends, days off, or national holidays. Approximately 87 per cent of the trips to the Park were strictly for pleasure with a surprising 12 per cent occurring on a combination trip of business and pleasure. The park was the main destination on 79 per cent of the trips while being a stopover on 21 per cent of the trips.

Party Composition, Activities, and Equipment

It is important to note from Table 37 that single families are the largest participants in all the activities. The specific activities grouped under "other" constitute a significant portion of the activities of which camping is a major activity in the Park.

Table 37

Party Composition and Activities

	%	% Swimming	% Picnicking	% Fishing
One Person Alone	4.20	2.74	1.25	3.90
Family and Children	48.51	60.67	49.22	55.67
Families and Children	5.96	7.01	10.59	7.09
Organized Groups	2.44	2.44	2.80	1.06
One Couple Only	22.22	12.50	19.00	18.44
Two or More Couples	5.69	3.66	7.17	5.67
Group of Friends	8.54	8.54	9.35	6.74
Other	1.76	1.83	------	1.06
Unknown	.68	.61	.62	.35
TOTAL	100.00	100.00	100.00	100.00

Table 37 continued

	% Walking	% Driving	% Others
One Person Alone	2.41	2.29	2.81
Family & Children	57.22	51.04	57.29
Families & Children	5.88	6.46	5.37
Organized Groups	1.60	1.46	2.05
One Couple Only	19.52	23.33	18.41
Two or More Couples	5.08	5.83	4.60
Group of Friends	7.22	7.92	7.93
Other	.53	1.25	1.28
Unknown	.53	.42	.26
TOTAL	100.00	100.00	100.00

Table 38 provides the breakdown for the 55 per cent of the visitors who visit the Park for more than a day's outing'. Nearly two thirds of these people stay for only one or two nights. This is due to the peak usage on weekends which creates the need for a level of facilities resulting in excess capacity for most of the week.

Table 38

Length of Stay

1 Night	37.37%
2 Nights	24.21%
3 Nights	9.74%
4 Nights	8.42%
5 Nights	4.74%
6 Nights	2.89%
7 Nights	3.16%
8 Nights	1.58%
9 Nights	.79%
10 Nights	7.11%

Table 39 provides an indication of what proportion of the visitors use various styles of accommodation and equipment.

Table 39

Accommodation and Equipment

Pickup Camper	5.83%
Tent Trailer	13.96%
Travel Trailer	12.33%
Tent	12.20%
Motel or Rental	4.61%
Private Cottage	20.19%
Boat	22.22%
Canoe	1.49%

Table 40 illustrates the range of party sizes and the distribution of them attending the Park. Nearly half of the groups are comprised of four or five people which corresponds to the average family size. This correlates with the fact that approximately 48 per cent of the parties are composed of a family and children.

Table 40

Party Size

1	3.17%
2	13.42
3	9.62
4	22.82
5	22.93
6	14.09
7 or more	13.94%

Summary of User Profiles

There are three distinct user groups. They vary basically in size and origin.

1) Residents of Medicine Hat: These users are principally day use and weekend visitors to the Park. They frequent the Park for the camping, picnicking, and swimming opportunities provided. Families account for half of these visitors.

2) Cottage Owners: While three-quarters of these visitors are from Medicine Hat they differ from the previous category in that they represent a more permanent type of user, tend to stay for longer periods, and exert no effect on campgrounds, although they do use the swimming facilities.

3) Non-local Visitors: These visitors are the remainder of the Alberta residents and the non-Alberta residents who visit the Park. In total they would account for around 60 per cent of the Park users. Their proportion of user days would be less because the largest number of them only use the Park for a stop-over point.

Socio-Economic Data

The following three tables (41, 42, and 43) provide some socio-economic data on the park users. From Table 39 it can be seen that more than half of the users are in what could be considered the middle and upper-middle income groups; in the $6,000 to $14,999 income range.

Table 41

Household Income of Park Users

Under - $ 3,000	6.64%
$ 3,000 - 5,999	21.14%
6,000 - 7,999	24.12%
8,000 - 9,999	13.96%
10,000 - 14,999	16.53%
Over 15,000	8.67%
Unknown	8.94%

Table 42 shows the distribution of users by occupation with the ranking for the first five shown as well. Professional/technical people and craftsmen and foremen are ranked very closely as one and two. Farm workers are ranked as number three; a reflection of the predominance of agriculture in this region.

Table 42

Occupation of Park Users

		Ranking
White Collar	1.22	
Professional/Technical	16.53	1
Managers/Proprietors	7.32	5
Clerical	3.52	
Sales	10.03	4
Blue Collar	.14	
Craftsmen and Foremen	16.26	2
Operatives	6.91	
Non Farm Labourers	1.76	
Other Service Working	5.28	
Farm Workers	10.16	3
Students	4.47	
Housewives	.41	
Retired	4.46	
Military	.54	
Unemployed	.14	
Not Stated	6.50	
Unknown	4.20	
TOTAL:	100.00	

The distribution of users by age groups is given in Table 43. Children, 0 - 19 years, constitute slightly over 47 per cent of the users. This is to be expected considering the heavy family usage the park receives. The age groups from 25 - 54 years, in which the bulk of the parents would be found, accounts for nearly 38 per cent of the users. Thus again the present use of the park is seen to be heavily family oriented.

Table 43

Age Groups

0 - 4 years	9.58%	47.43% Children
5 - 9 years	13.09%	
10 - 14 years	13.46%	
15 - 19 years	11.30%	
20 - 24 years	7.16%	
25 - 34 years	12.30%	37.66% Parents
35 - 44 years	13.35%	
45 - 54 years	11.41%	
55 - 64 years	5.44%	
65 - 69 years	1.08%	
+ 70 years	1.23%	

The relation between age groups and the activities they engage in is presented in Table 44. Certain age groups are engaged in some activities more than in others. For example, the over 45 age group is much more involved in the less active passtime of driving than in walking or swimming which require considerably more exertion.

Table 44

Age Group and Activities (Percentage Distribution)

	0-9	10-14	15-24	25-44	45-64	65+	Total
Swimming	47.53	60.11	47.88	28.98	20.58	6.45	38.93
Picnicking	45.89	48.75	49.70	50.00	46.90	37.10	48.02
Fishing	21.88	32.41	26.67	28.69	34.73	20.97	28.11
Walking	43.91	59.28	50.91	47.87	47.79	29.03	48.62
Driving	56.25	65.10	70.91	67.76	69.03	66.13	65.55
Other	49.67	62.60	56.36	58.81	43.14	29.03	53.47

Participation and Park Use

It is useful to know why visitors come to the Park. In 1967 a survey was undertaken in which questions were asked regarding the reason for using the Park. Table 45 presents the findings.

Table 45

Reason for Park Use

	Local Residents	Other Alberta Residents	Non-Alberta Residents
Swimming	76%	50%	67%
Camping	71%	77%	100%
Picnicking	53%	45%	--
Boating	29%	15%	--
Fishing	24%	19%	--
Nature	18%	15%	--

Local area residents use the Park for basic recreational activities such as swimming and picnicking, and as a camping area. The Park provides the same function for other Alberta residents. In this particular year the camping figure for Alberta residents is slightly higher than would be expected because some groups engaged in planned group activities camped when attending the Park. The 100 per cent camping figure for non Alberta residents is to be expected. Out of province tourists in the Park would likely spend a day in the Park and camp overnight.

The surveys conducted in 1967 provide other useful information. It is evident that some attractions are more popular among people travelling a greater distance. For example, "nature" is more of an attraction to people travelling 150 miles or more to the Park than to people travelling less than 50 miles. The reason for this is probably that the terrain and geography in the park is unique (and a pleasant change) to those coming a greater distance.

The activities given as the reasons for park use and the percentages of people corresponding to each use occurring in Cypress Hills Park can be compared to the overall participation in specific outdoor activities by Albertans and Canadians in general.

Certain activities such as all kinds of camping, picnicking, and hiking are increasing fairly rapidly in their participation rates (Table 46).

A comparison of the types of camping equipment used indicates that trailers (all types) have grown in popularity as compared to tents (Table 47). This increased popularity of trailers could have a bearing on the inclusion of amenities such as electrical outlets, and sewer hookups within park camping areas.

Table 46

Percentage of Albertans (Canadians) 18 Years and Over Participating in Outdoor Activities

	1967	1969	1972
Swimming	35 (39)	38 (44)	-- (--)
Tenting	16 (14)	17 (12)	25 (19)
Trailer Camping	8 (7)	6 (6)	18 (10)
Pick-up Camper	-- (--)	4 (2)	6 (4)
Bird Watching	-- (4)	-- (--)	-- (--)
Nature Study	-- (6)	-- (--)	-- (--)
Nature Study or Bird Watching	10 (--)	16 (12)	-- (--)
Looking at Scenery	44 (37)	-- (--)	-- (--)
Driving for Pleasure	54 (52)	65 (67)	68 (65)
Sightseeing from Vehicle	-- (--)	56 (43)	56 (38)
Picnics	49 (42)	68 (54)	61 (54)
Walking/Hiking	14 (14)	34 (37)	41 (39)

Table 47

Tent and Trailer Use in Cypress Hills

	Tents	Trailers	Total
1971 - 1972	3,475	13,451	16,926
1970 - 1971	2,780	11,542	14,322
1969 - 1970	2,743	8,287	11,030
1968 - 1969	2,324	5,116	7,440
1967 - 1968	1,797	2,574	4,371
1966 - 1967	1,634	1,819	3,453
1965 - 1966	1,784	875	2,659

There is a great variation in annual frequency of attendance at the Park. Table 48 shows the results of two surveys regarding the number of trips to the Park. A large part of the people making only one trip a year to the Park come from more than 100 miles away. Of those making three to five trips a year, most of the people were within 50 miles. All of the people making more than five trips were within 50 miles of the Park.

Table 48

Frequency of Visitations

	1967	1968
1 trip	52%	75%
2 trips	5%	10%
3 - 5 trips	22%	9%
More than 5 trips	21%	11%

Another facility which is not reflected in Park statisics yet is a snow skiing area just west of Highway 48. It is operated and used mainly by residents of Medicine Hat and the surrounding area. The capacities of its various facilities are as follows:

Lodge capacity	140 persons/day
Lift capacity	400 persons/day
Parking capacity	70 vehicles/day
Ski terrain capacity	540 persons/day

A fee of $4.00 per person per day is charged.

ECONOMIC BENEFITS

The economic benefits resulting from the recreational use of the Park are from two sources:

1) Fees collected in the Park;

2) Expenditures by Park visitors.

Table 49 indicates the growth in park revenues over the past several years.

Table 49

Recreational Revenues

Year	Revenue	Increase Over Previous Year	% Increase Over Previous Year
1969	$137,127.21	----	-----
1970	182,956.12	$45,828.91	33.4
1971	213,531.44	30,575.32	16.7
1972	261,224.66	48,693.22	22.8
1972 increase over 1969		$125,097.45	
1972 % increase over 1969		91.2%	

While attendance over this same period has fluctuated, Park revenues have steadily increased. This seems to support previous statements that the stated attendance figures are not entirely accurate.

While fees collected accrue to the provincial government directly, the benefits of expenditures by park visitors accrue to commercial and service operations in and around the Park. From Table 34 the average expenditure per person in 1971 is $52 while the average

expenditure per party per day is $29. A study undertaken in 1966 showed that the expenditure per person day (night) was $7.00. With a three per cent annual increase this will yield an expenditure of $8.61 in 1973. However, if the 1971 expenditure per party per day of $29 is divided by the average number of persons per day, an expenditure of $10.14 per person per day is obtained.

In fact expenditures were increasing at approximately nine per cent in this period reflecting increased expenditures on recreation activities. Thus a more realistic figure would be $12.82. These varying figures illustrate the impression of the data available.

While it may be possible to determine the number of out of province visitors based on the attendance figures and the percentage distribution of visitors origins, it is unlikely that such a figure would lead to a very accurate visitor expenditure estimate for Cypress Hills Park, unless further detailed surveys were undertaken. Visitors spend a larger part of their vacation funds in proportion in urban areas than in parks. This is a result of the higher cost of accommodations and the increased spending for entertainment and meals.

Day visitors to the park would not be expected to spend significant amounts of money on goods or services. These visitors, primarily from Medicine Hat, are those that come for picnicking and swimming or just "a day in the park".

The 55 per cent of the people staying for one or more nights are for all intents and purposes campers. A small percentage stay in the local motel and some stay in cottages. Campers carry a large part of their necessary supplies with them. Local purchases are only to refurbish their supplies and for daily refreshments.

Out of province visitors generally tend to spend more in Alberta per person than do Alberta residents. Thus their expenditures will be larger proportionately than will the expenditures of residents engaged in similar activities.

The economic benefits of expenditures by visitors can be measured on two levels:

1) Regional, and

2) Provincial.

On the regional level expenditures by visitors from other Alberta points are included as benefits. On the provincial level these expenditures are not counted as benefits. Rather they are considered as transfers from one provincial region to another since it is likely these expenditures would have occurred anyway. Intra-regional expenditures are treated in the same manner.

The estimation of expenditures as a result of Cypress Hills is difficult because of the lack of sufficient data on the groups and subgroups of visitors and their specific expenditure patterns. However, the park will have an effect on the economy of the region. In addition to the Albertan visitors some out of province visitors are attracted by the park. The benefits resulting from the presence of these visitors are counted on both the regional and the provincial levels. Thus the park also serves as a tourist attraction.

Other benefits to be considered are the value of the recreational opportunities to the users. These are difficult to measure but nevertheless must be considered.

In view of the fact that the existence of the park cannot be argued for on the grounds that specified economic benefits are present, it can be argued that the park is in existence to provide recreational benefits for the people of the province and especially those within the immediate vicinity, i.e. the non-monetary option

value of having recreation facilities available. This includes the residents of Medicine Hat for whom this park probably provides the primary focus of recreational activity within this area. Therefore costs are borne out of the provincial treasury to provide this facility for the "good of the people". Any monetary benefits such as from camping fees are considered to be incidental and are used to partially offset the costs of operating the park. The provision of recreational opportunities is a prime purpose of the park. Any economic benefit accruing to private individuals or enterprises as a result of visitor use of the park is considered as ancillary.

Alberta has a net inflow of expenditures resulting from domestic trips of 100 miles or more from the origin. The net inflow results as follows:

Receipts to Alberta	$55,765,000
Expenditures by Alberta	37,104,000
Net Inflow	$18,661,000

Expenditures through travel and tourism have an economic impact which is increased through the multiplier effect. However it should be noted that "the multiplier effect can only take place when there is sufficient slack in any economy either in terms of under-employment or potential improvement in productivity. In the case of tourism this is only significant at a local or sub-provincial regional level where labour is often brought in to peak seasonal needs." In and around Cypress Hills what most likely occurs is a large scale hiring of students in the summer months. The following table (50) gives an estimate of the disposition and income generated by a travel expenditure of one dollar for Alberta and for Canada.

Table 50

Expenditure and Income Generation

	Demand	Imports	Indirect Taxes	Depreciation Account	All Other Incomes	Income Multiplier
Alberta	1.00	.18	.14	.09	.58	2.1
Canada	1.00	.12	.14	.09	.65	2.8

	Total Income Generated*
Alberta	1.40
Canada	2.10

* Including depreciation account, excluding indirect taxes.

The income multiplier for Alberta is considered to be effective on $0.67 and not on $1.00 as would at first be expected. This lower figure is used because the value of imports and the value equivalent to indirect taxes must be deducted from the demand. Thus when the income multiplier is applied to $0.67, there is $1.40 of income generated.

It should be noted that taxes also recirculate and some of them are returned as income. Thus expenditures encouraged as a result of the existence of Cypress Hills Park produce additional benefits for the province throught the multiplier effect. Taxes collected from non-residents as well as residents are additions to the provincial treasury and are then partly recirculated as government expenditures throughout the province.

DEMAND FORECASTS

Incluencing Factors

The demand for recreational facilities and specifically the demand for recreation in Cypress Hills is dependent on several factors, some of which are not related to the park itself. These include the level of disposable income, the amount of leisure time available, and the existence of certain attitudes such as wanting to get away from the city.

Demand is also a function of the facilities available. Thus if facilities are provided it is more likely that people, once exposed to them, will exert a demand for them. An example is hiking or interpretive nature trails. Since demand is measured through the amount of use, the provision of trails can result in their being used. As people use them they may require (and request) more and improved trails.

The attractiveness and layout of the park will obviously affect the amount of use it receives as will its proximity to population centres in need of recreational facilities.

Potential Growth

Increases in the recreational use of Cypress Hills Park can occur in two ways:

1) increased use of those areas presently being used, eg. campgrounds, beach, picnic areas;

2) use of those areas of high recreational potential within the park which are not presently being used, or are being used very little.

It is not likely that there will be any significant increases in the use of those areas now being used as they are operating at or near capacity. Of course increased use can occur if certain improvements are made.

Some areas of the park have high recreational potential but are not now being used to any significant extent by recreationists. These areas include the creek valleys, forested areas, and the ridge of the plateua. The use of these areas (for wilderness hiking trails, nature interpretive trails, or for limited camping areas) will increase the recreational capacity of the park. The activities just mentioned are gaining in popularity and will serve to attract more people to the park.

One method of formulating demand forecasts is to take a straight line projection of recent increases in park attendance and participation. However, this is not a feasible alternative in predicting the growth in park attendance at Cypress Hills. As previously noted attendance has fluctuated widely for unknown reasons. In the previous discussions it was stated that demand for recreation was generally increasing and is expected to continue so. There is no reason to doubt that this will not happen with Cypress Hills if facilities are added and improved.

Some activities are growing in popularity faster than other. Table 51 shows the percentage increase in the incidence of participation in certain activities relevant to the use of Cypress Hills. The increases are for the years 1969 to 1972.

The national averages are provided for comparison. The participation in these activities can be expected to continue to increase along with increased demands for facilities. The rates of growth may slow down or level off as a larger percentage of the population becomes involved. The faster growing activities are the ones which will have a greater demand for facilities in the short term.

Table 51

Increases in Participation

	Alberta	Canada
Tent-camping	47%	58%
Trailer-camping	200%	67%
Pick-up camper	50%	100%
Pleasure driving	5%	- 3%
Sightseeing from Vehicle	--	-12%
Walking-hiking	20%	5%
Picnicking	-10%	--
Bicycling	--	46%

If improved facilities are provided the park will be more attractive to local and other Alberta residents. Attendance will increase. The numbers participating in activities in the park will increase. The greatest increases will occur in those activities which are now growing fastest in popularity. The growth in use of the park could reach the national average of approximately seven per cent.

There is no alternative park for the local residents. The park could continue to provide those services which the people are demanding and for which it is suitable to provide. As there are no provincial park substitutes in the vicinity for this park, a certain level of use is guaranteed. However, a high quality of services and facilities will increase the attractiveness and the usage rate. It appears that the park should provide facilities for a family type of recreation; that is, intensive use areas such as beaches, campgrounds, and picnic areas where possible. This is dependent on the physical capabilities of the park.

The natural beauty and characteristics of certain sections of the park will appeal to the segment of the population, local and tourist, in search of that specific type of recreation. In this way the park if properly planned and developed to provide for access and use of these areas, may become a substitute for other nature oriented parks. These non-intensive uses and the location of the sites will also be dependent on the physical capabilities of the resource base.

A central problem is one of determining the mix of intensive and extensive use areas according to the capabilities of the resource base to support these activities.

Cypress Hills Park is heavily used by families for intensive forms of recreation (camping, swimming, picnicking). This trend will continue as long as the facilities are available. The location and role of the park in relation to the population of Medicine Hat result in this type of use.

There are few alternative campgrounds within reasonable distance for the people of Medicine Hat to use for weekend camping. Thus even though the campgrounds are not the best planned and most attractive in Alberta, they are guaranteed a certain level of use. If better campgrounds were designed and built to either complement or replace the existing campgrounds, the absolute numbers of participating in camping in the park would increase. More residents and tourists would camp in the park. Some areas of the park would be attractive to campers but are not capable of supporting dense populations of campers. In these instances limited, low density campgrounds would be advisable. In this way camping units are provided to cater to the needs and wishes of the people while maintaining park quality.

Of those people staying overnight at the park the largest percentage use campgrounds as compared to using motels or cottages.

Table shows that tent usage in the park has increased by 194 per cent over six seasons while trailer usage has increased 1,537 per cent. These are equal to 32 per cent and 256 per cent average annual increases respectively. The increase in total campground use has been 636 per cent for a 106 per cent average annual increase. This phenomenal rate will not continue but will level off in the future making it easier to plan for the provision of adequate facilities up to the determined maximum capacity of the park.

Swimming is obviously centered around the lakes in the park. The provision and maintenance of safe, attractive beaches is necessary. Swimming is largely a day-use activity although campers also use the lake. Participation in swimming can be expected to increase with attendance increases. Picnicking and swimming are often complementary activities. The availability of facilities and the attractiveness of the surroundings influence the degree of picnicking.

The generally increasing awareness of the environment which is prevalent today lends support to the argument for the establishment of nature and interpretive trails on the basis of fulfilling the needs of the people using the park. Also, many people not now interested in using trails would take advantage of the existence of new trails in the park thus increasing the usage rate and demand.

LAND OWNERSHIP

● *LAND OWNERSHIP*

Grazing is presently sanctioned by the government in over 90 per cent of Cypress Hills Provincial Park. The areas under permit to individuals and grazing associations are shown on Map 37; also delineated are the deeded and leased lands adjacent to the Park.

Similarly, over the years water rights have been authorized within the Park. The holder, source, quantity, and purpose of these water rights is documented in Table 52.

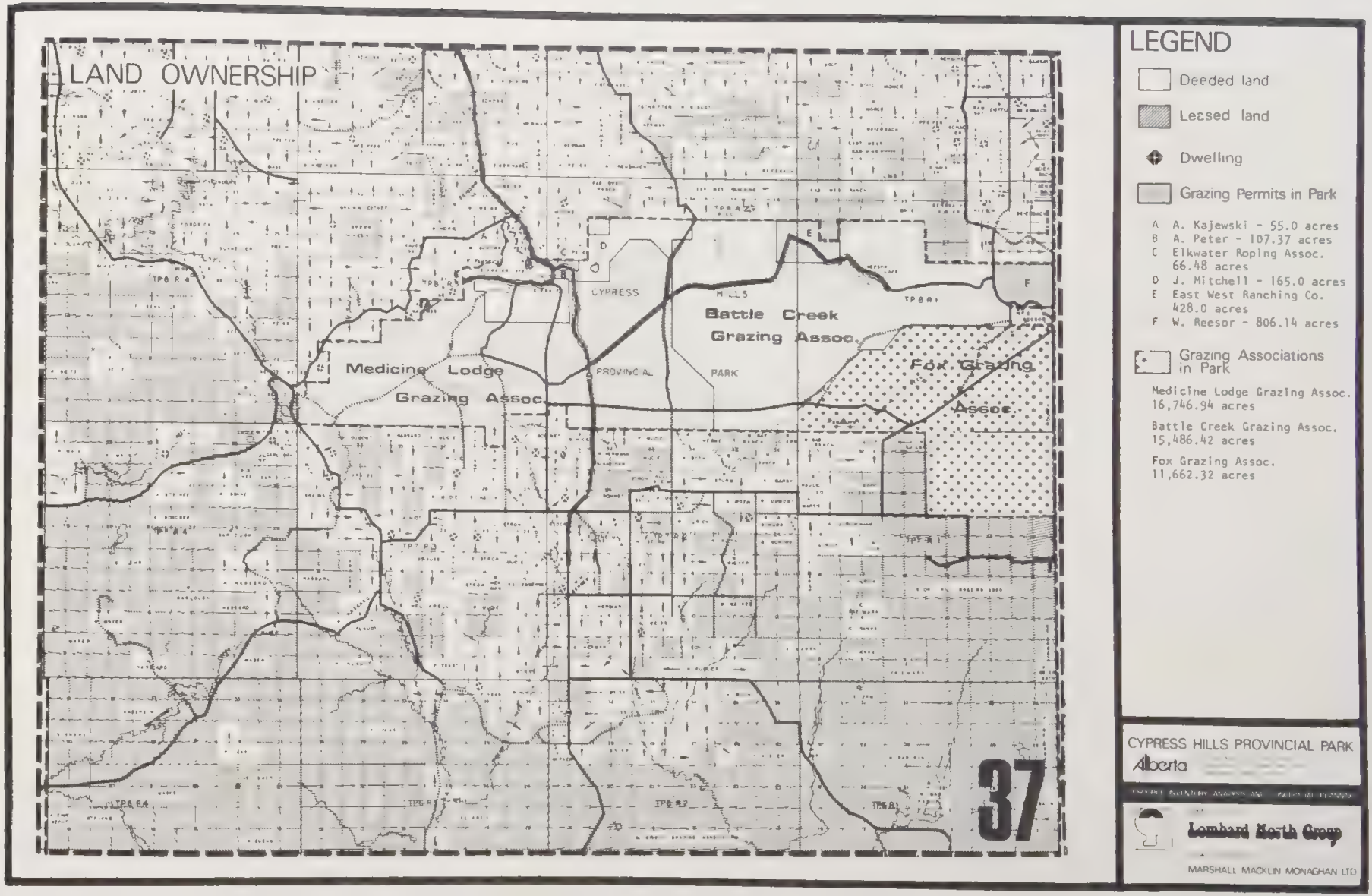
LAND OWNERSHIP
CYPRESS HILLS PROVINCIAL PARK
Battle Creek Grazing Assoc.
Medicine Lodge Grazing Assoc.
Fox Grazing Assoc.
37
LEGEND
Deeded land
Leased land
Dwelling
Grazing Permits in Park
A A. Kajewski - 55.0 acres
B A. Peter - 107.37 acres
C Elkwater Roping Assoc. 66.48 acres
D J. Mitchell - 165.0 acres
E East West Ranching Co. 428.0 acres
F W. Reesor - 806.14 acres
Grazing Associations in Park
Medicine Lodge Grazing Assoc. 16,746.94 acres
Battle Creek Grazing Assoc. 15,486.42 acres
Fox Grazing Assoc. 11,662.32 acres
CYPRESS HILLS PROVINCIAL PARK
Alberta
Lombard North Group
MARSHALL MACKLIN MONAGHAN LTD

Table 52

Water Rights,

Cypress Hills Provincial Park

Applicant	Source of Supply	Location	Annual Quantity (acre-feet/year)	Purpose
Reesor, W. Keith	Grayburn Cr.	NW13-8-1-4	75	Irrigation
Bennett, Alice Myrtle	Manyberries Cr.	SW3-5-7-4	122	Irrigation
Herman, Gustav	Ross Creek	NE19-8-2-4	27	Irrigation
Hassard, Claude	Lodge Creek	NE33-7-3-4	13	Irrigation
Kusler, Dave	Coulee 163	SE28-8-1-4	4	Domestic
Water Resources Div.	Coulee 76	NW26-8-2-4	500	Domestic
Water Resources Div.	Battle Creek	SE20-8-1-4	1500	Domestic
Provincial Parks	Mitchell Spr.	NE11-8-3-4	100	Municipal
Medicine Lodge Stock	Coulee	SW7-8-2-4	1	Municipal
E & W Ranching Co. Ltd.	Coulee	SE32-8-2-4	Nil	Flood Control
C.P.R. (Elkwater Lake Dam)	Ross Creek	NW31-11-2-4	46	Flood Control

PARKS POLICY

SUMMARY

DETAILED PARKS POLICY STATEMENT

PARKS POLICY

As indicated in the Archaeology/History Section, Cypress Hills Provincial Park has been managed over the years as a multiple-use forest reserve and never as a park in the modern sense. In an attempt to clarify the role of Provincial Parks in Alberta, the Department of Lands and Forests issued a Position Paper, "Provincial Parks Policy for Alberta, May, 1973," which provided guidelines affecting this study. The summary and detailed content of Position Paper No. 13 are quoted below:

SUMMARY

The Government of Alberta recognizes the need for a definitive parks policy, and to this end sets forth the following policy positions covering seven major program areas:

Expansion

The Alberta Government commitment to Provincial Parks will more the triple over three years:

- it will provide land acquisition for new park space
- it will upgrade present Provincial Parks
- it will develop presently undeveloped Provincial Parks

Natural Ecology

Provincial Parks should be developed in harmony with their natural attributes. We take the position that they should:

- develop according to ecological characteristics
- there should be emphasis on outdoor recreation
- we should preserve natural setting in perpetuity
- we should protect them from mechanized use and certain intensive developments

People

Provincial Parks must be more accessible to Alberta citizens and visitors:

- metropolitan Parks are needed; e.g. Fish Creek in Calgary
- we need to improve access for senior citizens and the disadvantaged
- there should be emphasis on family outings
- we should encourage public involvement in the planning process

Resource Development

There are conflicts which need to be resolved. To this end we propose to:

- reconcile certain long-standing conflicts
- preclude development where recreation conflicts is substantial
- provide strict supervision of existing resource developments
- enforced rigid reclamation requirements

Private Enterprise

Will be encouraged outside Provincial Parks as an important potential for rural development. Factors involved are:

- more Park space is needed
- larger Parks will be favored
- we should emphasize open space
- larger Parks should be zoned

Integrated Planning

Co-ordination with all recreation potentials is essential. We must work together in these related areas:

- National and Municipal Parks
- forest reserves and public land managment
- historical, cultural and wilderness values
- tourism promotion in Alberta

DETAILED PARKS POLICY STATEMENT

A Park is a tract of land offering varied outdoor recreational opportunities and containing natural scenic beauty or historical significance. In Alberta there are 51 Provincial Parks (see attached map) that comprise less than one per cent of Alberta. The five National Parks located in our Province cover over eight per cent of Alberta. Of the 51 Alberta Parks, 46 have some degree of development and five Parks are wholly undeveloped. The attached appendices give information on facilities and user statistics of the present Parks over the last five years.

The previous Parks Policy (1967) is as follows:

"Under the provisions of the Department of Lands and Forests Act, the Provincial Parks Act, and other pertinent statutes, the Department is charged with the management and administration of Provincial Parks.

The Provincial Parks Division of the Department of Lands and Forests is charged with all matters relating to the management and administration of Parks.

For purposes of administration, a park is any area designated under the provisions of the Provincial Parks Act.

The fundamental and important obligation in the administration of parks is to preserve from impairment all significant objects and features of nature in the park and its natural recreational activities and developments in perpetuity."

The present Government regards the foregoing as an inadequate and incomplete statement of Parks Policy.

The Government's assessment is that the present Provincial Parks system in Alberta is inadequate. More park space is needed. Many existing Provincial Parks are badly in need of upgrading; some areas had been declared as Provincial Parks without advance physical or financial planning. There are serious resource development conflicts in certain Provincial Parks. The most serious Provincial Park system defect is location; Albertans in metropolitan centers are seriously disadvantaged in their opportunities to enjoy our Parks. The problem is especially acute for disadvantaged Albertans and for senior citizens.

It is essential that Park Policy be integrated with both tourism potential and other outdoor recreation opportunities such as wilderness and sportsman activities.

For the Alberta Provincial Park system of the future, the Government of Alberta sets forth this seven-point statement of Parks Policy:

Expansion

Financial Commitment for Provincial Parks in Alberta will more than triple over the next three years. This 300 per cent increase, starting with 1973, will result in a dramatic expansion of our Parks system through land acquisition, upgrading, and new development. There will be new Provincial Parks. Defective and inadequate Parks will be properly developed with a systematic upgrading program. Previously declared but undeveloped Parks will be properly planned and developed. Data on Provincial Parks expenditures over the last five years are attached.

Natural Ecology

Parks should be nature oriented. There are four ecological zones in Alberta: Short Grass Prairie, Foothills, Aspen Parkland, and Northern Forest (note the attached brochure). Provincial Parks in Alberta will be selected, planned, and developed to emphasize opportunity for outdoor open-space recreation experience and to preserve, and where possible improve, the ecological character of the Park in perpetuity. Interpretive nature programs will be emphasized. Alberta's Parks lands will be protected from mechanized use such as snowmobiles and all-terrain-vehicles (ATV's). Other activities such as townsites, swimming pools, organized athletic games, rodeos, and private cottages will be regarded as conflicts in new Parks.

People

Parks are for People - Albertans and Alberta visitors - Parks must be accessible. The Government is determined that its Parks be located for more equal access. The attached map includes 50-mile radius circles around Edmonton and Calgary; it can readily be seen that access to Provincial Parks is very limited for more than half of the citizens of Alberta. The newly announced Provincial Park in Calgary on Fish Creek relieves the Parks access disadvantage for Calgarians. Within 18 months the Government plans to announce a Provincial Park in the metropolitan Edmonton area. We recognize that in the accelerated life of today people's happiness through physical and mental health can be provided by the Parks outdoor experience. In our Parks the opportunity for family outings will be emphasized. Public involvement will be sought in the planning of new Parks and major Park expansions; part of the planning process for new Parks will be public hearings in the locality of the new Park. The Government of Alberta is and shall remain open to public comment and suggestion in its constant effort to improve the Provincial Parks of Alberta.

Resource Development

Resource development and park use will be reconciled. Resource development will be precluded where it is in substantial conflict with outdoor recreation experience. In many Provincial Parks resource development should be ruled out. Boundary adjustments will be considered where necessary. Resource development that can occur will be under strict supervision and rigid conditions of reclamation.

Private Enterprise

The recreation market offers a great opportunity for rural development; e.g. campground facilities. The Government will encourage the development of recreation opportunities by private enterprise. Private planners and consultants will be used in Provincial Parks planning. Except for more remote locations, Provincial Parks will emphasize day-use recreational activites. Private enterprise will be challenged to provide outside our Parks.

These developments would be subject to proper health and environmental standards.

Larger Parks

Provincial Parks should be larger. Cypress Hills is the largest Provincial Park by far with Dinosaur next and then Lesser Slave Lake. Most Alberta Provincial Parks are small; more than half (27 Parks) are under 500 acres in size. The new Park on Fish Creek in Calgary is a step toward a new policy direction of larger Provincial Parks. This metropolitan Provincial Park will be eighth largest in Alberta. The larger Provincial Parks should be zoned so the recreational needs of more people can, in harmony with the recreation capability of the area, be considered in park design.

Integrated Planning

The Government of Alberta recognizes that Provincial Parks are some of the building blocks in the broad sweep of Alberta's recreation potential. There are others. Provincial Parks policy and planning will integrate with factors related to: National Parks, Municipal Parks, the recreation potential of Alberta's forest reserves, tourism promotion in Alberta, management of public land on the east slopes of the Rockies, historical and cultural heritage programs, wilderness areas, and other recreational potentials. The overall objective is to co-ordinate development of Alberta's recreation potentials by providing a variety of outdoor recreation experiences while conserving Alberta's natural beauty for her future generations.

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APPENDICES

1. VEGETATION COMMUNITIES
2. GRASSLAND CHARACTERISTICS
3. SOIL PROFILES
4. SCIENTIFIC NAMES OF FAMILIES AND SPECIES OF MAMMALS
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APPENDICES

APPENDIX 1

VEGETATION COMMUNITIES

This Appendix was prepared from species lists provided by Breitung (1954). Vegetation was assigned to community types according to Breitung's description. In some cases, it was not possible to place species in any type due to incomplete descriptions. Assignment of species to a particular type was made only when it was possible to be reasonably sure of that placement from the habitat description or when species had been observed to occur in that habitat.

ROADSIDES & INTRODUCED SPECIES

Family and Species	Occurrence
Gramineae	
Agropyron repens	
Bromus inermis	common
Hordeum jubatum	common
Poa annua	
Poa pratensis	
Polygonaceae	
Polygonum achoreum	occasional
P. convolvulus	occasional
Rumex acetosella	occasional
Chenopodiaceae	
Axyris amaranthoides	
Chenopodium album	
Monolepis nuttalliana	
Amaranthaceae	
Amaranthus graezicans	
Amaranthus retroflexus	
Ranunculaceae	
Ranunculus acris	
Cruciferae	
Descurainia sophia	common
Lepidium densiflorum	
Sis mbrium altissimum	
Thlaspi arvense	common
Capparidaceae	
Cleome serrulata	occasional
Leguminosae	
Melilotus alba	common
M. officinalis	common
Trifolium hybridum	
T. pratense	
T. repens	
Geraniaceae	
Geranium carolinianum	frequent
G. bicknellii	occasional
Euphorbiaceae	
Euphorbia glyptosperma	

Family and Species	Occurrence
Onagraceae	
Oenothera biennis	occasional
Boraginaceae	
Lappula echinata	
Labiatae	
Moldavica parviflora	common
Plantaginaceae	
Plantago major	common
Compositae	
Arctium minus	
Cirsium arvense	
C. vulgare	
Erigeron canadensis	
Lactuca scariola	
Madia glomerata	
Matricaria matricarioides	
Taraxacum officinale	

PONDS AND STREAMS

Family and Species	Occurrence
Najadaceae	
Potamogeton gramineus	scarce
P. richardsonii	common
P. strictifolius	common
P. vaginatus	occasional
Zannichellia palustris	common
Alismaceae	
Alisma plantago aquatica var. triviale	scarce
Sagittaria cuneata	occasional
Gramineae	
Agrostis exarata	scarce
A. palustris	occasional
Alopecurus aequalis	occasional
Catabrosa aquatica	occasional
Elymus canadensis	occasional
Glyceria borealis	occasional
G. grandis	common
Muhlenbergia racemosa	scarce
Lemnaceae	
Lemna minor	
L. trisulca	common
Salicaceae	
Salix amygdaloides	scarce
S. interior	occasional
Betulaceae	
Betula fontanalis	common

Family and Species	Occurrence
Polygonaceae	
Polygonum lapathifolium	occasional
P. natans	
Ranunculaceae	
Ranunculus aquatilis	common
R. purshii	occasional
Callitrichaceae	
Callitriche autumnalis	occasional
C. palustris	
Aceraceae	
Acer negundo	scarce
Haloragidaceae	
Hippuris vulgaris	frequent
Myriophyllum spicatum	common
Primulaceae	
Primula incana	occasional
Gentianaceae	
Gentiana affinis	occasional
Labiatae	
Lycopus asper	occasional

Family and Species	Occurrence
Scrophulariaceae	
Mimulus guttatus	common
Veronica comosa	occasional
Lentibulariaceae	
Utricularia minor	occasional
U. vulgaris var. americana	
Compositae	
Bidens cernua	occasional
Xanthium echinatum	occasional

MARSH & WET MEADOW

Family and Species	Occurrence
Equisetaceae	
Equisetum fluviatile	occasional
E. variegatum	frequent
Typhaceae	
Typha latifolia	common
Sparganiaceae	
Sparganium eurycarpum	common
S. multipedunculatum	frequent
Lilaeaceae	
Lilaea scilloides	rare

Family and Species	Occurrence
Scheuchzeriaceae	
Triglochin maritima	common
T. palustris	
Gramineae	
Agrostis exarata	scarce
Calamagrostis canadensis	common
C. inexpansa	occasional
C. neglecta	occasional
Danthonia unispicata	
Deschampsia caespitosa	occasional
Glyceria striata	frequent
Hordeum brachyantherum	occasional
H. jubatum var. caespitosum	scarce
Phalaris arundinacea	common
Phleum alpinum	frequent
Poa palustris	frequent
Schizachne purpurascens	occasional
Sphenopholis intermedia	scarce
S. obtusata	
Cyperaceae	
Carex spp.	43 species
Eleocharis calva	common
E. palustris	common
Scirpus microcarpus	scarce
S. pauciflorus	common
S. validus	common
Juncaceae	
Juncus spp.	10 species

Family and Species	Occurrence
Orchidaceae	
Habenaria hyperborea	common
Spiranthes romanzoflora	rare
Salicaceae	
Populus balsamifera	common
Salix candida	occasional
S. maccalliana	occasional
S. planifolia	common
S. pseudomonticola	common
S. serissima	occasional
Urticaceae	
Urtica gracilis	occasional
Polygonaceae	
Polygonum coccineum	occasional
Rumex mexicanus	frequent
R. occidentalis	frequent
Ranunculaceae	
Ranunculus macounii	frequent
Cruciferae	
Barbarea orthoceras	scarce
Cardamine pensylvanica	uncommon
Rorippa palustris	occasional
Saxifragaceae	
Parnassia palustris	occasional

Family and Species	Occurrence
Rosaceae	
Geum macrophyllum	common
G. rivale	abundant
Potentilla anserina	occasional
P. norvegica	occasional
P. palustris	occasional
Rubus paracaulis	occasional
Leguminosae	
Oxytropis deflexa	scarce
Violaceae	
Viola nephrophylla	occasional
Onagraceae	
Boisduvallia glabella	rare
Epilobium glandulosum	frequent
Epilobium leptophyllum	occasional
Umbelliferae	
Cicuta douglasii	occasional
Heracleum lanatum	common
Perideridia gairdneri	common
Sium suave	scarce
Primulaceae	
Lysimachia thyrsiflora	occasional
Boraginaceae	
Allocarya californica	scarce
Labiatae	
Lycopus americanus	occasional
Mentha arvensis	common
Scutellaria epiloblifolia	occasional
Stachys palustris ssp. pilosa	frequent
Rubiaceae	
Galium trifidum	occasional
G. triflorum	occasional
Compositae	
Arnica chamissonis	scarce
Aster coerulescens	occasional
A. junciformis	occasional
Erigeron philadelphicus	scarce
Grindelia squarrosa	common
Helianthus fascicularis	occasional
Petasites sagittatus	scarce
Pyrrocoma lanceolata	
Senecio exaltatus	occasional

WILLOW COMMUNITIES

Family and Species	Occurrence
Equisetaceae	
Equisetum variegatum	occasional
Gramineae	
Calamagrostis purpurescens	common

Family and Species	Occurrence
Salicaceae	
Salix bebbiana	common
S. dicolor	occasional
S. interior	common
S. pseudocordata	common
Betulaceae	
Betula pumila	occasional
Compositae	
Senecio multnomensis	scarce

GRASS SHRUBLAND, SHRUBLAND, MIXED GRASSLAND

Family and Species	Occurrence
Equisetaceae	
Equisetum kansanum	frequent
E. prealtum	common
Selaginellaceae	
Selaginella densa	abundant
Pinaceae	
Juniperus communis	frequent
J. horizontalis	occasional
Graminae	
Agropyron albicans	scarce
A. dasystachyum	common
A. inerme	common
A. riparium	scarce
A. smithii	frequent
A. spicatum	scarce
Bromus marginatus	common
B. pumpellianus	scarce
Calamagrostis montanensis	occasional
Calamovilfa longifolia	occasional
Festuca saximontana	common
Koeleria cristata	frequent
Muhlerbergia cuspidata	occasional
Oryzopsis asperifolia	occasional
O. hymenoides	occasional
Stipa columbiana	rare
S. comata	common
S. spartea var curtiseta	occasional
Liliaceae	
Allium cernuum	frequent
A. textile	occasional
Salicaceae	
Populus tremuloides	common
Polygonaceae	
Eriogonum flavum	common
Polygonum douglasii	occasional
Chenopodiaceae	
Atriplex nuttallii	occasional

Family and Species	Occurrence
Chenopodiaceae (continued)	
Chenopodium leptophyllum	scarce
Eurotia lanata	occasional
Caryophyllaceae	
Arenaria congesta	common
A. rubella	scarce
Cerastium arvense	frequent
Paronychia sessiliflora	common
Silene drummondii	occasional
S. menziesii	rare
Cruciferae	
Arabis divaricarpa	occasional
A. glabra	scarce
A. holboelli	
Draba nemorosa	common
Crassulaceae	
Sedum stenocarpum	common
Saxifragaceae	
Heuchera flabellifolia	rare
Saxifraga rhomboidea	rare
Rosaceae	
Amelanchier alnifolia	common
Chamaerhodos nuttallii	occasional
Crataegus chrysocarpa	occasional
Potentilla arguta	frequent
P. concinna	occasional
P. effusa	occasional
P. hippiana	common
P. pensylvanica	common
Prunus pensylvanica	occasional
Rosa arkansana	common
Leguminosae	
Astragalus bisulcatus	occasional
A. drummondii	occasional
A. missouriensis	
A. striatus	frequent
A. succulentus	scarce
A. triphyllus	frequent
Hedysarum boreale	occasional
Oxytropis gracilis	occasional
O. spicata	frequent
Petalostemon candidum	occasional
Psoralea argophylla	occasional
Psoralea esculenta	scarce
Linaceae	
Linum lewisii	frequent
L. rigidum	scarce
Anacardiaceae	
Rhus aromatica var. trilobata	scarce
R. radicans	occasional
Malvaceae	
Sphaeralcea coccinea	occasional

Family and Species	Occurrence
Violaceae	
Viola adunca	common
Cactaceae	
Mamillaria vivipara	frequent
Opuntia polyacantha	common
Onagraceae	
Epilobium paniculatum	scarce
Gaura coccinea	occasional
Oenothera caespitosa	
O. flava	scarce
O. nuttallii	
Umbelliferae	
Lomatium macrocarpum	occasional
Musineon trachyspermum	occasional
Cornaceae	
Cornus stolonifera	occasional
Primulaceae	
Androsace septentrionalis var. puberulenta	occasional
Apocynaceae	
Apocynum sibiricum	rare

Family and Species	Occurrence
Polemoniaceae	
Collomia linearis	common
Boraginaceae	
Lithospermum ruderale	frequent
Oreocarya glomerata	occasional
Solanaceae	
Solanum triflorum	occasional
Scrophulariaceae	
Besseya cinerea	scarce
Orthocarpus luteus	common
Penstemon albidus	occasional
Orobanchaceae	
Orobanche fasciculata	scarce
O. ludoviciana	rare
Plantaginaceae	
Plantago elongata	
Caprifoliaceae	
Symphoricarpos occidentalis	common
Compositae	
Antennaria aprica	frequent
A. microphylla	common
A. reflexa	occasional
Artemisia cana	occasional

Family & Species	Occurrence
Compositae (continued)	
A. dracunculoides	occasional
A. forwoodii	occasional
A. frigida	common
A. pabularis	scarce
Aster canescens	scarce
A. commutatus	occasional
A. ericoides	occasional
A. laevis	common
Chrysopsis villosa	common
Erigeron caespitosus	common
E. compositus	occasional
E. drummondii	scarce
E. radicatus	scarce
Gutierrezia diversifolia	occasional
Helianthus rigidus	common
Hieracium canadense	common
Hymenoxys richardsonii	occasional
Lepachys columnifera	occasional
Liatris punctata	common
Lygodesmia juncea	occasional
Senecio canus	common
S. scribneri	scarce
Sideranthus grindelioides	occasional
S. spinulosus	frequent
Solidago decumbens var. oreophila	occasional
S. missouriensis	common
Stenotus armerioides	scarce
Townsendia escapa	occasional
Tragopogon dubius	occasional

FESCUE GRASSLAND

Family and Species	Occurrence
Pinaceae	
Pinus contorta	occasional
Gramineae	
Agropyron subsecundum	common
A. trachycaulum	occasional
Danthonia californica	occasional
D. intermedia	common
Festuca idahoensis	common
Festuca scabrella	abundant
Helictotrichon hookeri	common
Hierochloe odorata	rare
Poa canbyi	frequent
P. interior	common
P. secunda	frequent
Liliaceae	
Zygadenus elegans	common
Z. gramineus	common
Iridaceae	
Sisyrinchium angustifolium	occasional
Santalaceae	
Comandra pallida	scarce
Ranunculaceae	
Anemone multifida	frequent
Delphinium bicolor	common
Pulsatilla ludoviciana	common
Ranunculus cardiophyllus	common
R. pedatifidus	common

Family and Species	Occurrence
Cruciferae	
Arabis hirsuta	occasional
Erysimum parviflorum	scarce
Lesquerella alpina	
L. ludoviciana	
Saxifragaceae	
Heuchera richardsonii	occasional
Rosaceae	
Geum triflorum var. ciliatum	common
Potentilla diversifolia	occasional
P. fruiticosa	abundant
P. gracilis	common
P. pulcherrima	common
Leguminosae	
Astragalus agrestis	frequent
A. caespitosus	common
A. vexilliflexus	occasional
Hedysarum alpinum var. americanum	common
Lupinus argenteus	abundant
Thermopsis rhombifolia	frequent
Vicia sparsifolia	scarce
Umbelliferae	
Zizia aptera	common
Primulaceae	
Dodecatheon conjugens	frequent
Scrophulariaceae	
Penstemon procerus	common
Veronica peregrina var. xalapensis	scarce
Rubiaceae	
Galium boreale	common
Campanulaceae	
Campanula rotundifolia	common
Compositae	
Achillea millefolia ssp. lanulosa	frequent
Antennaria anaphaloides	scarce
Arnica fulgens	common
Gaillardia aristata	common
Senecio pauperculus	frequent
Solidago nemoralis var. decemflora	occasional

ASPEN GROVELAND

Family and Species	Occurrence
Ophioglossaceae	
Botrychium lunaria	rare
Gramineae	
Alopecurus glaucus	rare
Bromus marginatus	common
Elymus innovatus	occasional

Family and Species	Occurrence
Orchidaceae	
Habenaria viridis	occasional
Salicaceae	
Populus tremuloides	abundant
Salix bebbiana	common
Polygonaceae	
Polygonum aviculare	occasional
P. bistortoides	
Ranunculaceae	
Anemone cylindrica	occasional
Rosaceae	
Amelanchier alnifolia	common
Fragaria glauca	common
Geum allepicum var. stirctum	occasional
Leguminosae	
Astragalus canadensis	occasional
Elaeagnaceae	
Elaeagnus commutata	common
Sherpherdia canadensis	common
Onagraceae	
Epilobium angustifolium	common
Primulaceae	
Steironema ciliatum	occasional
Gentianaceae	
Gentiana amarella	occasional
Apocynaceae	
Apocynum androsaemifolium	frequent
Scrophulariaceae	
Collinsia parviflora	common
Rhinanthus crista-galli	frequent
Caprifoliaceae	
Symphoricarpos albus	common
Compositae	
Antennaria campestris	occasional
A. corymbosa	occasional

ASPEN FOREST

Family and Species	Occurrence
Ophioglossaceae	
Botrychium virginiana	rare

Family and Species	Occurrence
Pinaceae	
Picea glauca	common
Pinus contorta	common
Gramineae	
Bromus anomalus	common
B. ciliatus	common
B. purgans	common
Elymus glaucus	common
Poa glaucifolia	occasional
Stipa richardsonii	frequent
Liliaceae	
Disporum trachycarpum	common
Smilacina amplexicaulus	frequent
S. stellata	common
Orchidaceae	
Corallorhiza maculata	occasional
C. striata	occasional
Salicaceae	
Populus tremuloides	dominant
Salix scouleriana	common
Caryophyllaceae	
Arenaria lateriflora	common
Ranunculaceae	
Actaea rubra	occasional
Anemone canadensis	common
Clematis verticellaris	frequent
Thalictrum venulosum	occasional
Saxifragaceae	
Ribes oxyacanthoides	common
Rosaceae	
Fragaria glauca	common
Rosa acicularis	common
R. woodsii	common
Rubus pubescens	frequent
R. strigosus	occasional
Leguminosae	
Astragalus americanus	occasional
Lathyrus ochroleucus	common
Vicia americana	frequent
Geraniaceae	
Geranium richardsonii	common
Violaceae	
Viola rugulosa	common
Umbelliferae	
Osmorhiza longistylis	occasional
O. obtusa	frequent

Family and Species	Occurrence
Pyrolaceae	
Pyrola elliptica	scarce
Caprifoliaceae	
Viburnum edule	frequent
V. trilobum	occasional
Compositae	
Aster ciliolatus	common
Aster conspicuus	common
Hieracium albiflorum	common

PINE FOREST

Family and Species	Occurrence
Lycopodiaceae	
Lycopodium annotinium	scarce
L. obscurum	rare
Pinaceae	
Picea glauca	common
Pinus contorta	dominant
Gramineae	
Calamagrostis rubescens	occasional
Danthonia spicata	frequent
Elymus innovatus	occasional
Trisetum spicatum	frequent
T. wolfii	occasional
Orchidaceae	
Calypso bulbosa	rare
Corallorhiza trifida	occasional
Goodyera oblongifolia	common
Salicaceae	
Populus tremuloides	occasional
Salix scouleriana	common
Loranthaceae	
Arceuthobium americanum	
Ranunculaceae	
Clematis verticillaris	
Saxifragaceae	
Ribes triste	occasional
Rosaceae	
Prunus virginiana var. melanocarpa	frequent
Sorbus scopulina	occasional
Spiraea lucida	common
Umbelliferae	
Osmorhiza chilensis	frequent
Cornaceae	
Cornus canadensis	common

Family and Species	Occurrence
Pyrolaceae	
Chimaphila umbellata	scarce
Monotrapa langinosa	scarce
Pterospora andromedea	occasional
Pyrola asarifolia	frequent
P. secunda	frequent
P. virens	occasional
Ericaceae	
Arctostaphylos uva-ursi	abundant
Vaccinium caespitosum	abundant
Scrophulariaceae	
Castilleja miniata	common
Caprifoliaceae	
Linnaea borealis var. americana	abundant
Viburnum edule	frequent
Compositae	
Anaphalis margaritacea	scarce
Antennaria corymbosa	occasional
A. howellii	common
Antennaria obovata	common
A. oxyphylla	occasional
A. rosea	frequent
Arnica cordifolia	common
Aster conspicuus	common
Erigeron droebachiensis	

Family and Species	Occurrence
Polypodiaceae	
Cystopteris fragilis	scarce
Dryopteris disjuncta	rare
Equisetaceae	
Equisetum arvense	common
E. pratense	occasional
E. scirpoides	occasional
E. sylvaticum	scarce
Pinaceae	
Picea glauca	dominant
Pinus contorta	rare
Gramineae	
Cinna latifolia	occasional
Liliaceae	
Streptopus amplexifolius	rare
Orchidaceae	
Cypripedium passerinum	scarce
Habenaria obtusata	occasional
Listera borealis	scarce
Orchis rotundifolia	common
Cruciferae	
Erysimum cheiranthoides	frequent
Saxifragaceae	
Mitella nuda	occasional

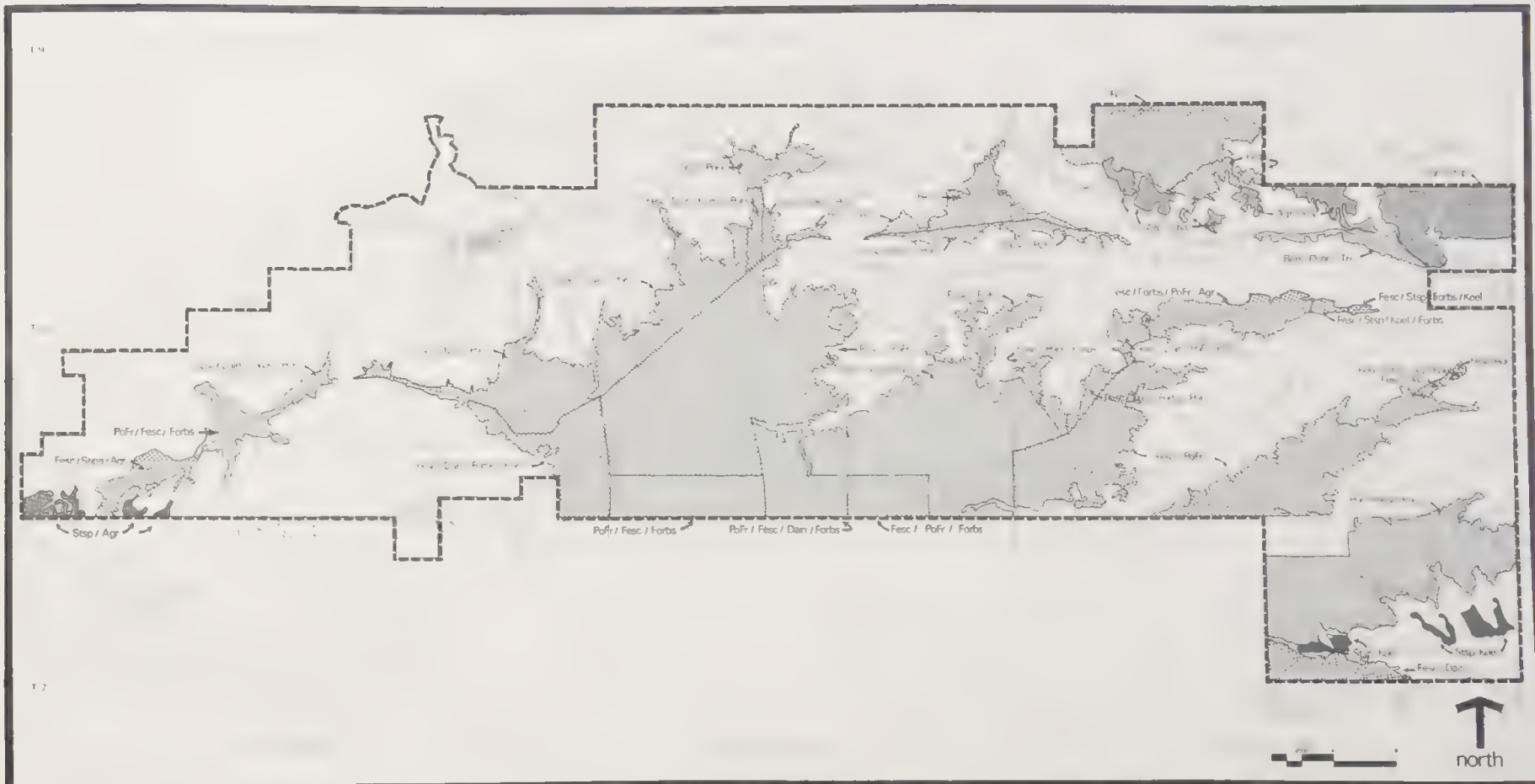
Family and Species	Occurrence
Saxifragaceae (continued)	
Ribes hudsonianum	occasional
R. lacustre	scarce
Rosaceae	
Rubus acaulis	rare
R. pubescens	frequent
Pyrolaceae	
Moneses uniflora	common
Pyrola minor	occasional
P. secunda	frequent
Compositae	
Aster oregonus	frequent
Lactuca spicata	scarce
Petasites palmatus	scarce
P. vitifolius	scarce
Senecio indecorus	occasional

APPENDIX 2

GRASSLAND CHARACTERISTICS

This Appendix was compiled from a grassland evaluation conducted by Robbins and Wershler (1971). The grassland characteristics mapped and the procedure utilized are indicated below.

	Grassland Map	Procedure
Map 10a	Dominant Species	Visual estimate of dominant and subordinate species.
Map 10b	Condition and Trend	Field estimate of whether range was improving or deteriorating based on evaluation of several indicators.
Map 10c	Grazing Capability	Field estimate of palatable forage (biomass) in pounds per acre.
Map 10d	Vulnerability	Composite evaluation based on (1) grassland type, and (2) condition and trend rating indicating susceptibility to further damage from continued grazing.


PoFr / Fesc / Forbs
Fesc / Stipa / Agr
Stsp / Agr
PoFr / Fesc / Forbs
PoFr / Fesc / Dain / Forbs
Fesc / PoFr / Forbs
Fesc / Forbs / PoFr Agr
Fesc / Stsp / Forbs / Koel
Fesc / Stsp / Koel / Forbs
north

LEGEND

DOMINANT SPECIES

- Fesc Fescue varieties
- Stipa spartea
- Potentilla Fruticosa
- Agropyron spp.
- Bromus inermus

OTHER SPECIES

Agr	Agropyron spp.	Prpr	Petalum purpureum
Brin	Bromus inermis	PoFr	Potentilla Fruticosa
Dain	Danthonia intermedia	Stsp	Stipa spartea
Fesc	Festuca spp.	Tn	Trifolium spp.
Koel	Koelenia cristata		

GRASSLAND

DOMINANT SPECIES

10a

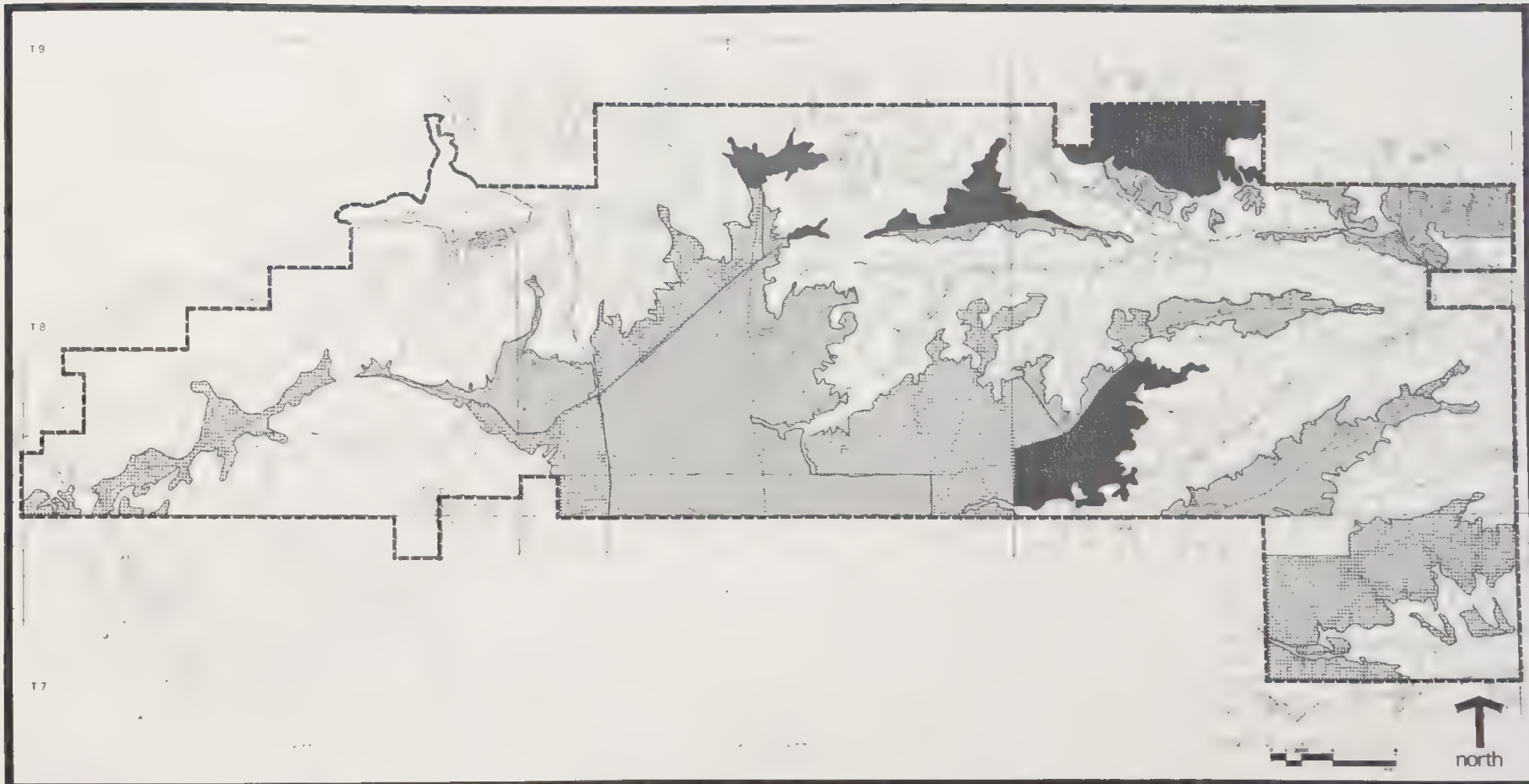
CYPRESS HILLS PROVINCIAL PARK

Alberta

RESOURCE INVENTORY, ANALYSIS AND CONCEPTUAL PLANNING

Lombard North Group

MARSHALL MACKLIN MONAGHAN LTD



LEGEND

CONDITION & TREND

- HIGH
- MEDIUM
- LOW

GRASSLAND

CONDITION & TREND

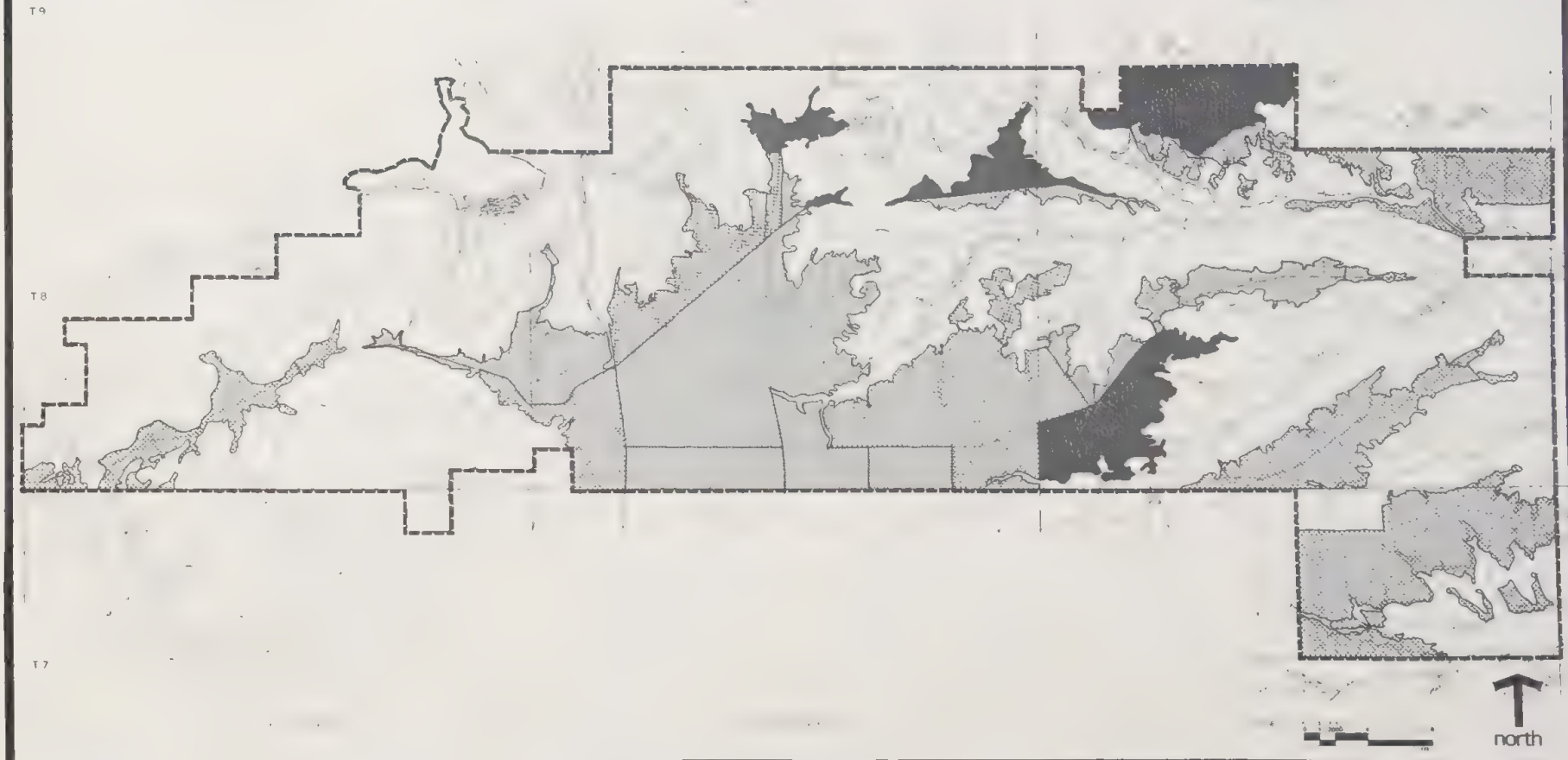
10b

CYPRESS HILLS PROVINCIAL PARK

Alberta

Lombard North Group

MARSHALL, MACKLIN MONAGHAN LTD



LEGEND

GRAZING CAPABILITY

- MEDIUM
- LOW

GRASSLAND

GRAZING CAPABILITY

10c

CYPRESS HILLS PROVINCIAL PARK

Alberta

Lombard North Group

MARSHALL, MACKLIN MONAGHAN LTD.

LEGEND

VULNERABILITY

- EXTREME
- HIGH
- MODERATE
- LOW

GRASSLAND

VULNERABILITY TO FURTHER DAMAGE
FROM CONTINUED GRAZING

10d

CYPRESS HILLS PROVINCIAL PARK

Alberta

Lombard North Group

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APPENDIX 3

SOIL PROFILES

This Appendix consists of representative soil profile descriptions prepared by Jungerius (1969).

Profile 1

Location:	49° 39'N, 110° 3'50" W; northern edge of Cypress /Hills plateau.
Slope:	less than 1°;
Elevation:	1,369 m;
Vegetation:	grass;
Surface Soil:	Dark Brown Chernozemic.

Parent Material	Depth (cm)	Horizon	Description
Aeolian deposit	0-6	A11	Very dark grayish brown (10YR3/2, Munsell Color Charts) humic clay loam; abundant small spots of lighter colored material; weak coarse crumb structure; very friable; rare pebbles; humus 6.2%; pH 6.7 (KCl 6.2).
	6-15	A12	Very dark brown (10YR2/2) humic clay loam; moderate coarse crumb structure; very friable; rare pebbles; humus 5.1%; pH 7.5 (6.6).
	15-24	AB	Brown (10YR4/3) clay loam; moderate coarse prismatic structure; friable; occasional pebbles.
	24-39	B2	Brown (10YR4/3) clay loam; moderate coarse prismatic structure; friable; occasional pebbles; pH 7.7 (6.8).
	39-47	B3	Dark yellowish brown (10YR4/4) clay loam; moderate coarse prismatic structure; very friable.
Solifluction Material	47-55	(11)BC	Dark yellowish brown to olive brown (10YR4/4-2.5Y4/4) clay loam weak medium prismatic structure; very friable; many pebbles.
	55-75	(11)C	Grayish brown (10YR5/2-2.5Y5/2) clay loam; friable; many pebbles; pH 7.6 (6.6).

Profile 2

Location:	49° 37'30"N, 110° 18'W; southern edge of Cypress /Hills plateau
Slope:	2°;
Elevation:	1,395 m;
Vegetation:	forested;
Surface Soil:	Grey-Wooded

Parent Material	Depth(cm)	Horizon	Description
Reworked aeolian material	2	A0	Decomposing leaf mat.

	0-3	A1	Grayish brown (2.5Y5/2) slightly humic silt loam; weak fine crumb and fine platy structure soft many rootlets.
	3-17	A2	Light gray (2.5Y6/2) silt loam; moderate very fine platy structure; soft; pH 6.5 (3.7)
	17-25	A3	Light olive brown (2.5Y5/4) silt loam; weak medium platy structure; soft; light gray (2.5Y7/2) silt powdering on ped surfaces; pH 7.6 (4.0).
	25-37	AB	Light olive brown (2.5Y5/4) clay; medium angular blocky structure; friable; light brownish grey (2.5Y6/2) silt powdering on ped surfaces; occasional pebbles.
	37-52	B21t	Light olive brown (2.5Y5/4) clay; medium angular blocky structure; friable; greyish brown (2.5Y5/2) clay skins; occasional pebbles; pH 5.8 (4.0).
	52-67	B22T	Light olive brown (2.5Y5/4) silty clay; medium angular blocky structure; friable, olive (5Y5/3) clay skins; pH 6.7 (5.0).
Ravenscrag formation	67-96	(11)C	Grayish brown and very dark grey (2.5Y5/2) and 10Y3/1) clay; decomposing siltstone.

Profile 3

Location: 49°38'N, 110°15'W; Cypress Hills plateau surface;
Slope: less than 1°;
Elevation: 1,420 m;
Vegetation: grass;
Surface Soil: Black Chernozemic developed from Grey-Wooded (2nd group of horizons).

Parent Material	Depth (cm)	Horizon	Description
Upper aeolian material	0-11	A1	Black (10YR2/1) humic silt loam; moderate medium crumb and weak fine platy structure; very friable; many rootlets.
	11-28	B2/2A2	Pale brown (10YR6/3) silt loam; weak medium prismatic and fine platy structure; friable; occasional pebbles; humus 3%; pH 5.3 (4.1).
Solifluction material	28-40	2AB	Yellowish brown (10YR5/4) loam; weak coarse prismatic and platy; friable; silt powdering on ped surfaces; discontinuous dark yellowish brown (10YR4/4) clay skins; many pebbles.
Lower aeolian material	40-70	2B2t	Dark brown (10YR4/3) silty clay; weak prismatic and angular blocky; friable; dark yellowish brown clay skins; occasional pebbles; pH 5.3 (4.1).
Cypress Hills formation	70+	(11)C	Conglomerate.

Profile 4

Location: 49° 39'20"N, 110° 11'50"W; Cypress Hills plateau
Slope: less than 1°; /surface.
Elevation: 1,395 m;
Vegetation: forest;
Surface Soil: Grey-Wooded developed from Chernozemic (2nd group of horizons) and Grey-Wooded (3rd group of horizons).

Parent Material	Depth (cm)	Horizon	Description
Upper aeolian material	1	A0	Decomposing forest litter.
	0-2	A1	Dark grey (10YR4/1) silt loam; moderate fine crumb structure; very friable.
	2-6	A2	Light grey (10YR7/1) silt loam; moderate fine platy structure; slightly hard.
	6-17	AB/2B1	Brown (10YR5/3) silt loam; weak medium platy structure; slightly hard; light grey silt powdering on ped surfaces.
Solifluction material	17-27	2B22	Yellowish brown (10YR5/4) silt loam; weak medium platy structure; slightly hard; occasional pebbles in lower part.
Lower aeolian material	27-36	3AB	Brown (10YR5/3) silt loam, weak fine subangular blocky structure; slightly hard; light grey silt powdering on ped surfaces; few pebbles.
	63-79	3B22t	Dark yellowish brown (10YR4/4) clay; moderate medium subangular blocky structure; friable; clay skins; few pebbles.
Solifluction material	79+	(11)3B23t?	Dark brown (7.5YR4/4) clay; weak fine subangular blocky structure; friable; clay skins; many pebbles.

Profile 5

Location: 49° 39'20"N, 110° 1'10"W; alluvial fan in Battle
Slope: 4°; /Creek Valley;
Elevation: 1,160 m;
Vegetation: grass;
Surface Soil: Dark Brown Chernozemic.

Parent Material	Depth (cm)	Horizon	Description
Late Recent colluvial material	0-19	A1	Very dark brown (10YR2/2) humic sandy loam; weak fine crumb structure; very friable.
	19-31	B2	Olive brown (2.5Y4/4) sandy loam, weak medium prismatic structure; very friable; occasional pebbles
	31-39	Cca	Light brownish grey (2.5Y6/2) sandy loam; very friable; occasional pebbles; CaCO3 accumulation in spots and veins.
	39-56	(11)Cca	Light olive brown (2.5Y5/4) sandy loam; very friable; abund-

			ant pebbles; $CaCO_3$ accumulation in spots and veins.
	56-61	(111)C	Olive brown (2.5Y4/4) sandy loam; weak medium prismatic structure; very friable.
Early Recent colluvial material	61-69	(111)2A1	Black (10YR2/1) humic sandy loam; weak fine to medium prismatic; very friable. (The radio-carbon age of the organic matter in this buried Black Chernozemic soil is 3,610 ± 100 years).
	69+	(111)C	Light olive brown (2.5Y5/3) sandy loam; very friable.

Profile 6

Location: 49° 31'30"N, 110° 13'50"W; streambank on southern
Slope: 1.2°; /pediment;
Elevation: 1,180 m;
Vegetation: grass and shrubs;
Surface soil: Black Chernozemic.

Parent Material	Depth (cm)	Horizon	Description
Alluvium	0-6	A1	Very dark grey (10YR3/1) humic loam; weak crumb structure; slightly hard; frequent rootlets; humus 10.7%; pH 6.0 (5.4).
	6-9	(B)C	Dark greyish brown (10YR4/2) loam; moderate fine prismatic and subangular blocky structure; hard; occasional rootlets; humus 2.2%; pH 6.2 (5.7).
	9-20	2A1	Very dark grey (10YR3/1) loam; weak fine prismatic and subangular blocky structure; hard; humus 7.2%; pH 6.5 (5.9). (The radio-carbon age of the organic matter in this buried Black Chernozemic soil is 580± 95 years).
	20-35	C	Brown (10YR5/3) loam; weak medium prismatic; hard; stoneline at 25 cm; humus 1.4%; pH 7.2 (6.4).
	35-38	3A1	Black (10YR2/1) loam; weak sub-angular blocky structure; hard; humus 7%, pH 7.6 (6.8).
	38-45	C	Brown (10YR5/3) loam; weak angular blocky structure; hard; common faint gley mottles; pH 7.7 (6.9).
	45-50	4A1	Very dark grey (10YR3/1) loam; moderate very fine crumb and sub-angular blocky structure; hard; humus 4.1%; pH 7.7 (6.8). (The radiocarbon age of the organic matter in this buried Black Chernozemic soil is 1,250± 130 years.)
	50-59	(11)Cca	Dark greyish brown (10YR4/2) sandy loam; abundant pebbles; $CaCO_3$ 8.7%; pH 7.8 (7.2).

APPENDIX 4

SCIENTIFIC NAMES OF FAMILIES AND SPECIES OF MAMMALS

SHREWS - Family Soricidae

Duskey shrew	Sorex vagrans soperi
Cinereous shrew	Sorex cinereus haydeni

BATS - Family Vespertilionidae

Pale big-eared bat	Myotis evotis evotis
Say masked bat	Myotis subulatus sublatus
Pale big brown bat	Eptesicus fuscus pallidus
Eastern red bat	Lasiurus borealis borealis

HARES AND RABBITS - Family Leporidae

White-tailed prairie hare	Lepus townsendii campanius
American varying hare	Lepus americanus americanus
Black Hills cottontail rabbit	Sylvilagus nuttallii grangeri

MARMOTS AND SQUIRRELS - Family Sciuridae

Richardson ground squirrel	Spermophilus richardsonii richardsonii
Stripped ground squirrel	Spermophilus tridecemlineatus pallidus
Little Northern chipmunk	Eutamias minimus borealis
Red squirrel	Tamiasciurus hudsonicus

POCKET GOPHERS - Family geomyidae

Amderson pocket gopher	Thomomys talpoides andersoni

POCKET MICE AND RATS - Family Heteromyidae

Maximilian pocket mouse	Perognathus fasciatus fasciatus
Montana kangaroo rat	Dipodomys ordii terrosus

BEAVERS - Family Castoridae

Missouri river beaver	Castor canadensis missouriensis

NATIVE MICE AND RATS - Family Cricetidae

Prairie harvest mouse	Reithrondontomys megalotis dychei
Osgood white-footed mouse	Peromyscus maniculatus osgoodi
Badlands white-footed mouse	Peromyscus leucopus aridulus
Audubon grasshopper mouse	Onychomys leucogaster missouriensis
Grey bushy-tailed wood rat	Meotoma cinerea cinerea
Plains red-back vole	Clethrionomys gapperi loringi
Badlands meadow vole	Microtus pennsylvanicus insperatus
Pallid vole	Lagurus curtatus pallidus
Great Plains muskrat	Ondatra zibethicus cinnamominus

JUMPING MICE - Family Zapolidae

Saskatchewan jumping mouse	Zapus princeps minor

PORCUPINES - Family Erethizontidae

California porcupine	Erethizon dorsatum epixanthum

COYOTES AND FOXES - Family Canidae

Prairie coyote	Canis latrans latrans
Northern Plains red fox	Vulpes fulva regalis

RACOON - Family Procyonidae

Upper Mississippi Valley racoon	Procyon lotor nirtus

WEASELS, MINK, BADGER, SKUNK - Family Mustelidae

Little Rocky Mountain weasel	Mustela erminea invicta
Prairie long-tailed weasel	Mustela frenata longicauda
Hudson Bay mink	Mustela vison lacustris

American badger	Taxidea taxus taxus
Northern Plains skunk	Mephitis mephitis hudsonica

CATS - Family Felidae

Canada lynx	Lynx canadensis canadensis
Pallid barred bobcat	Lynx rufus pallescens

DEER - Family Cervidae

Elk	Cervus canadensis
Rocky Mountain mule deer	Odocoileus hemionus hemionus
White-tailed deer	Odocoileus virginianus
Moose	Alces alces

ANTELOPE - Family Antilocapridae

American prong-horned antelope	Antilocapra americana

APPENDIX 5

SCIENTIFIC NAMES FOR FAMILIES AND SPECIES OF BIRDS

LOONS - Family Gaviidae

Common loon	Gavia immer

GREBES - Family Colymbidae

Red-necked grebe	Podiceps grisena
Horned grebe	Podiceps auritus
Eared grebe	Podiceps nigricollis
Pied-billed grebe	Podilymbus podiceps

CORMORANTS - Family Phalacroracidae

Double-breasted cormorant	Phalacrocorax auritus

HERONS, BITTERNS - Family Ardeidae

Great blue heron	Ardea herodias
American bittern	Botauru lentiginosus

WATERFOWL - Family Anatidae

American widgeon	Anas americana
Mallard	Anas platyrhynchos
Pintail	Anas acuta
Blue-winged teal	Anas discors
Lesser scaup	Aythya affinis
Redhead	Aythya americana
Common merganser	Mergus merganser
White-winged scoter	Melanitta deglandi
Canada goose	Branta canadensis
Trumpeter swan	Olor buccinator

HAWKS, FALCONS- Family Falconidae

Red-tailed hawk	Buteo jamaicensis
Swainson's hawk	Buteo swansoni
Broad-winged hawk	Buteo platypterus
Goshawk	Accipiter gentilis
Sharp-shinned hawk	Accipiter striatus
Cooper's hawk	Accipiter cooperii
Marsh hawk	Circus cyaneus
Merlin	Falco columbarius

GROUSE - Family Tetraonidae

Ruffed grouse	Bonasa unbellus
Sharp-tailed grouse	Pedioecetes phasianellus

PHEASANTS, TURKEYS, PARTRIDGES - Family Phasianidae

Wild turkey	Meleagris gallopavo

RAILS, COOTS - Family Rallidae

Sora	Porzana carolina

PLOVERS - Family Charadriidae

Killdeer	Charadrius vociferus

SNIPES, CURLEWS, SANDPIPERS - Family Scolopacidae

Wilson's snipe	Capella gallinago
Long-billed curlew	Numenius americanus
Upland plover	Bartramia longicauda
Spotted sandpiper	Actitis macularia

AVOCETS - Family Recurvirostridae

American avocet	Recurvirostra americana

PHALAROPES - Family Phalaropidae

Wilson's phalarope	Steganopus tricolor

GULLS & TERNS - Family Laridae

California gull	Larus californicus
Ring-billed gull	Larus delawarensis
Common tern	Sterna hirundo
Black tern	Chlidonias niger

PIGEONS, DOVES - Family Columbidae

Morning dove	Zenaida macroura
Rock dove	Columbia livia

CUCKOOS - Family Cuculidae

Black-billed cuckoo	Coccyzus erythropthalmus

OWLS - Family Strigidae

Great horned owl	Bubo virginianus
Long-eared owl	Asio otus
Short-eared owl	Asio flammeus
Saw-whet owl	Aegolius acadicus
Barn owl	Tyto alba

GOATSUCKERS - Family Caprinulgidae

Common night hawk	Chordeiles minor
Poor-will	Phalaenoptilus nuttallii

HUMMINGBIRDS - Family Trochilidae

Riby-throated hummingbird	Archilochus colubris

KING FISHERS - Family Alcidinidae

Belted kingfisher	Megaceryle alcyon

WOODPECKERS - Family picidae

Red-shafted flicker	Colaptes auratus cafer
Yellow-shafted flicker	Colaptes auratus auratus
Hairy woodpecker	Dendrocopus villosus
Downy woodpecker	Dendrocopus pubescens
Yellow-bellied sapsucker	Sphyrapicus varius
Red-headed woodpecker	Melanerpes erythrocephalus

FLYCATCHERS - Family Tyranidae

Eastern kingbird	Tyrannus tyrannus
Western kingbird	Tyrannus verticalis
Say's pheobe	Sayornis saya
Traill's flycatcher	Empidonax traillii
Least flycatcher	Empidonax minimus
Dusky flycatcher	Empidonax oberholseri

LARKS - Family Alaudidae

Horned lark	Eremophila alpestris

SWALLOWS - Family Hirondidae

Bank swallow	Riparia riparia
Rough-winged swallow	Stelgidopteryx ruficollis
Barn swallow	Hirundo rustica
Cliff swallow	Petrochelidon pyrrhonota
Violet-green swallow	Tachycineta thalassina

CHICKADEES - Family Paridae

Black-capped chickadee	Parus atricapillus

NUTHATCHES - Family Sittidae

Red-breasted nuthatch	Sitta canadensis

CREEPERS - Family Certhidae

Brown creeper	Certhia familiaris

WRENS - Family Troglodytidae

House wren	Troglodytes aedon
Rock wren	Salpinctes obsoletus

MOCKINGBIRDS, THRASHERS - Family Mimidae

Catbird	Dumetella carolinensis
Brown thrasher	Torostoma rufum

THRUSHES - Family Turidae

Robin	Turdus migratorius
Swainson's thrush	Catharus ustulatus
Veery	Catharus fuscescens
Mountain bluebird	Sialia currocoides

CROWS, MAGPIES, JAGS - Family Corvidae

Common crow	Corvus brachyrhynchos
Black-billed magpie	Pica pica

VIREOS - Family Vireonidae

Red-eyed vireo	Vireo olivaceus
Warbling vireo	Vireo gilvus

WOOD WARBLERS - Family Parulidae

Orange-crowned warbler	Vermivora celata
Yellow warbler	Dendroica petechia
Yellow-rumped warbler	Dendroica coronata auduboni
Ovenbird	Seiurus aurocapillus
MacGillivray's warbler	Oporornis tolmiei
Yellowthroat	Geothlypis trichas
Yellow-breasted chat	Icteria virens
American redstart	Setophaga ruticilla

MEADOW LARKS, BLACKBIRDS, ORIOLES - Family Icteridae

Bobolink	Dodichonyx oryzivorus
Western meadow lark	Sturnella neglecta
Yellow-headed blackbird	Xanthocephalus xanthocephalus
Red-winged blackbird	Agelaius phoeniceus
Northern oriole	Icterus galbula galbula
Brewer's blackbird	Euphagus cyanocephalus
Common grackle	Quiscalus quiscula
Brown-headed cowbird	Molothrus ater

SPARROWS - Family Fringillidae

Pine siskin	Spinus pinus
American goldfinch	Spinus tristis
Red crossbill	Loxia curvirostra
Rufous-sided towhee	Pipilo erythrophthalmus
Lark bunting	Calamospiza melanocorys
Vesper sparrow	Pooecetes gramineus
Savannah sparrow	Passerculus sandwichensis
Baird's sparrow	Ammodramus bairdii
Grasshopper sparrow	Ammodramus savannarum
Lark sparrow	Chondestes grammacus
Dark-eyed junco	Junco hyemalis oreganus
Chipping sparrow	Spizella passerina
Clay-coloured sparrow	Spizella pallida
White-crowned sparrow	Zonotrichia leucophrys
Song sparrow	Melospiza melodia

SPARROWS (continued)

Chestnut-collared longspur	Calcarius ornatus
McCown's longspur	Rhyncophanes mccownii

APPENDIX 6

SCIENTIFIC NAMES OF AMPHIBIANS & REPTILES

Western painted turtle	Chrysemys picta belli
Common snapping turtle	Chelydra serpentina
Short horned lizard	Phrynosoma douglassi
Red-sided garter snake	Thamnophis sirtalis parietalis
Western plains garter snake	Thamnophis radix
Hognosed snake	Heterodon nasicus
Bullsnake	Pituophis melanoleucus sayi
Rattlesnake	Crotalus viridis viridis
Blotched tiger salamander	Ambystoma trigrinum melanostrictum
Plains spade foot toad	Scaphiopus bombifrons
Great plains toad	Bufo cognatus
Boreal chorus frog	Pseudacris triseriata maculata
Northern leopard frog	Rana pipiens pipiens

APPENDIX 7

ARCHAEOLOGICAL SITES

This Appendix of known archaeological resources of the Park was compiled from Bonnichson (1972).

Map No.	Site No.	Description	Merit Further Investigation
1	DjOm 117	quartzite flakes, fired rocks	Y
2	DjOm 112	talus pits	Y
3	DjOm 111	quartzite flakes	N
4	DjOm 107	quartzite flakes, cobble tool	Y
5	DjOm 105	talus pits, bison bone, iron file	Y
6	DjOm 102	cobble tools	N
7	DjOm 104	talus pits, bone fragment	Y
8	DjOm 106	rock figure (effigy)	N
9	DjOm 116	quartzite flakes, fired rocks, bone fragments	N
10	DjOm 115	quartzite flakes, fired rocks, bone fragments	N
11	DjOm 110	quartzite flakes	N
12	DkOm 100	quartzite flakes, cobble tools	Y
* 13	DjOm 114	quartzite flakes, bone splinters (dated - 4000 B.C.)	Y
14	DkOm 107	quartzite flake, bone scraps	Y
15	DkOm 108	quartzite material	Y
* 16	DjOm 113	quartzite flakes, cobble tools, projectile points (Duncan and Besant), bifacially flaked knives, tipi ring.	Y
17	DjOn 120	quartzite and chert flakes and artifacts campsite debris.	Y
18	DjOn 110	talus pits, quartzite flakes, split cobbles	Y
19	DjOn 111	cobble tools, triangular point, flake scraper, tipi ring	Y
20	DjOn 106	cobble tools	Y
21	DjOn 112	talus pits, quartzite flakes	Y
22	DjOn 119	cobble choppers	N
23	DjOn 118	quartzite flakes and tools, bone scraps	Y
* 24	DjOn 117	quartzite flakes, bone (dated - 7000 B.C.)	Y
25	DjOn 107	talus pits	N
26	DjOn 101	fired rocks, workshop debris	Y
27	DjOn 123	quartzite, chert, and argillite flakes	N
28	DjOn 118	quartzite flakes	N
29	DkOm 106	fired rocks, workshop debris,artifacts	Y
30	DkOn 102	quartzite flakes	Y
31	DkOn 101	quartzite flakes, talus pits	Y
* 32	DjOn 116	cabin complex (2)	Y
33	DjOo 119	quartzite flakes, fired rocks, point fragment	N
34	DjOo 100	cobble tools, ohe graver, triangular point	N
35	DjOo 105	quartzite flakes, choppers, and scrapers, broken bones	N
36	DjOo 104	quartzite flakes and tools, broken bones	N
37	DjOo 118	quartzite, chalcedony, and obsidion flakes	N
38	DjOo 113	fired rocks, quartzite and knife river flint flakes, cobble tools, bone fragments	N
39	DjOn 122	quartzite flakes, cobble choppers	N
40	DjOn 105	cobble tools	Y
41	DjOo 125	cabin complex (3)	Y
* 42	DjOo 124	cabin	Y
* 43	DjOo 120	cabin	Y
* 44	DjOo 102	cobble choppers, leaf-shaped chert knife end scraper, arrow wrench	Y
* 45	DjOo 123	mounds and pits	N
* 46	DjOo 126	cobble tools, rock figure (effigy)	Y
47	DjOn 100	cobble tools, triangular point, pot, bison bone fragments, quartzite flakes	Y

Map No.	Site No.	Description	Merit Further Investigation
48	DkOn 103	hearths, tipi rings, cobble tools	N
49	DjOn 115	mounds and pits	Y

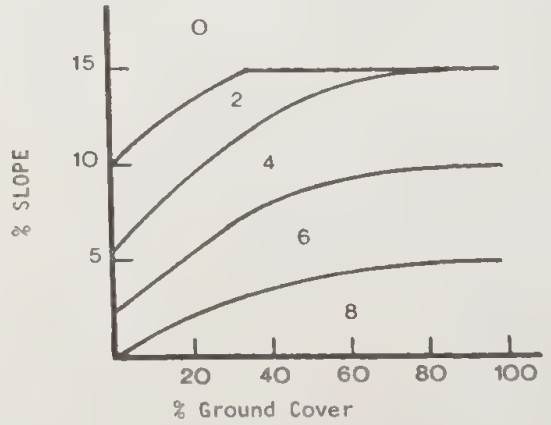
* Major Sites

APPENDIX 8

SITE CAPABILITY RATING SCALE

This Appendix lists (1) the Site Capability Rating Scale developed by Lesko (1973), and (2) the results of a site capability survey conducted in the Park in July, 1973 using Lesko's rating system.

Factors Considered	Numerical Scale
• Degree days above 42°	
1000 or less	1
1001 to 1600	2
1601 to 2300	3
2301 to 3000	4
• Mean annual water deficit (in inches)	
8.1 to 12	2
4.1 to 8	4
0.1 to 4	6
0	8
• Shrub cover (in percent)	
0 - 10	1
11 - 25	2
26 to 50	4
51 to 75	6
76 to 100	8
• Grass cover (in percent)	
0 - 10	1
11 - 25	2
26 - 50	4
51 to 75	6
76 to 100	8
• Depth of rooting (in inches)	
0 - 5	0
5.1 to 10	2
10.1 to 20	4
20.1 +	8
• Slope and total ground cover	



• Thickness of the Ah soil horizon (in inches)	
0 - 0.5	2
0.6 to 1.0	4
1.1 to 2.0	6
2.1 +	8

Factors Considered	Numerical Scale
• Thickness of the forest floor - LFH layers (in inches)	
0 - 0.5	1
0.6 to 2.0	2
2.1 to 3.0	3
3.1 +	4
• Soil Texture and Drainage	
Organic) Dune sand)	x0 (multiplier factor)
Wet clay) Wet loam) Dry sand)	x0.6
Dry clay) Dry loam) Gravel)	x0.8
Semi-dry clay) Semi-dry loam) Wet sand)	x1.0

SITE CAPABILITY SURVEY DATA *

Factors	Plateau	Open Forest	Meltwater Channel
Degree days	1800	2000	2200
Water deficit	4 inches	6	8
Shrub cover (%)	11 to 25	0 to 10	11 to 25
Grass cover (%)	26 to 50	26 to 50	51 to 75
Depth of Rooting (in.)	10.1 to 20	5.1 to 10	20.1 +
Slope/Ground cover (%)	0 to 5/60	0 to 5/60	0 to 5/60
Thickness of Ah (in.)	3	1.1 to 2.0	2.5
Thickness of LFH (in.)	0 to 0.5	0.6 to 2.0	0 to 0.5
Soil properties	dry loam/gravel	semi-dry clay/loam	semi-dry loam

* Average values from 20 sites evaluated.

APPENDIX 9

LEASE EXPIRY SCHEDULE, ELKWATER

Years to Run in Leases on a Block Basis

Year	73	74	75	76	77	78	79	80	81	82	83	84	TOTAL	
Block													No.	%
1	1		1		2								4	1.6
2	1	1					1	1	1		2	1	8	3.1
3		1	2	1			1	1			2		8	3.1
4		1				1	1		2	2			7	2.7
5		1					12	1		1	1		16	6.4
6		2					7	3		2	3		17	6.6
7		1						7	3	4			15	5.8
8		1				1	12	1	3		2		20	7.8
9	1	1		1	1	1	3	6	1	1	2		18	7.0
10							2	4	6	4	2		18	7.0
11		1				1	5	1	6	7	2		23	9.0
12	2	1	3		1	1	1		1	6	1		17	6.6
13	1	1		2	1		3	5	1	3	1		18	7.0
14							2	5	2	1	6		16	6.4
15							1						1	.4
16							1			1	1		3	1.2
17				2	1	1	14	3	1	3	3		28	11.3
18	2		2		2			2	3	2	5		18	7.0
TOTAL	8	12	8	6	8	6	66	40	30	37	33		255	100.00
%	3.1	4.7	3.1	2.3	3.1	2.4	25.8	15.6	11.7	14.8	12.9	.4		